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THIRD REPORT ON A RAT-FLEA SURVEY OF THE CITY OF SAN JUAN, PORTO RICO [1]

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During the third and last year of this survey (from July 1, 1928, to June 30, 1929) cage traps were set on an average in 39 localities every day at the rate of 5.5 traps to each locality. Rats were caught in 1.4 per cent of the premises. It has been estimated that, on an average, 3.2 rodents were captured per 1,000 traps distributed. According to these data, the rat infestation of the city appears to have been lower than in the two preceding years.

Among the 249 live rats captured, 218 were adults, 10 were partially grown, and 21 were young. There were 112 males and 137 females, 34, or 24.8 per cent, of which were found pregnant, bearing an average of 6.6 foeti each. The highest number of foeti found in any one rat was 11.

The following table shows the relative concentration of the species in the various zones of the city:

Table 1.—*Comparative concentration of the species in different zones—Numbers of traps set and rats captured*

	Zone			
	1	2	3	4
Total traps set	38,560	8,095	16,187	15,694
Total rats captured	93	28	60	68
Average number of rats per 1,000 traps set	2.4	3.5	3.7	4.3

Evidently, the vermin this year have been more uniformly distributed throughout the town. The great drop of the rat index in Zones 2 and 4, as compared with the two preceding years, is especially notable.

Mus norvegicus, as was expected from our previous experience, has been by far the prevailing rodent. (See Table 2.) Chart 1 shows the incidence of the different species in the various zones.

Fleas were collected from 68 per cent of the rats captured. Their total number for the year was 1,970. Of these, 1.067 were males and 903 females—a ratio of 1.2 to 1. Zone 1 (docks) furnished the highest number—1,065. Zone 3 (commercial), Zone 4 (residential), and Zone 2 (water front) followed with 386, 378, and 141 fleas, respectively.

[1] Reprinted from the Porto Rico Journal of Public Health and Tropical Medicine, December, 1929, pp. 158-166.

TABLE 2.—*Monthly classification of rats*

Species	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
Norvegicus	21	27	19	13	13	9	16	8	3	3	5	3	140
Rattus	7	10	3	1	4	1	1	1	6	13	1	1	49
Alexandrinus	3	5	4	3	10	5	8	7	5	2	5	3	60
Total	31	42	26	17	27	15	25	16	14	18	11	7	249

Classification of the insects, though revealing four different species, showed that *Xenopsylla cheopis* continues to be the predominating flea among our rats.

TABLE 3.—*Monthly classification of insects*

Species	Sex	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
Xenopsylla cheopis	M.	92	168	66	15	107	52	30	152	42	172	127	32	1,055
	F.	63	141	65	4	85	42	29	99	40	181	109	12	870
Echidnophaga gallinacea	M.					3		1					1	5
	F.	9				9		2			7	5	2	34
Ctenocephalus canis or felis	M.	1							1					2
	F.					1							1	2
Pulex irritans	M.									1				1
	F.											1		1
Total		165	309	131	19	205	94	62	252	83	360	242	48	1,970

The flea index for the year may be expressed as 7.9 fleas per rat, while the cheopis index is 7.7. The highest number of fleas found on a single rat was 111. It was an adult male *rattus* captured at "La Popular" dock (Zone 1) on April 29, 1929. All of these fleas were classed as *Xenopsylla cheopis*.

The following table shows the relative concentration of the insects in the various zones of the city:

TABLE 4.—*Comparative flea infestation in different zones*

	Zone			
	1	2	3	4
Percentage of rats with fleas	78.5	50.0	71.7	57.4
Average number of fleas per rat	11.5	5.0	6.4	5.5

Obviously the docks have been more heavily infested than any other district in San Juan, which is in keeping with our observations of previous years.

The monthly variation of the flea index has been recorded as follows:

TABLE 5.—*Monthly flea indices*

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	For the year
Percentage of rats with fleas	61.3	64.3	57.7	53.0	70.4	60.0	52.0	94.0	71.4	100.0	90.9	85.6	68.0
Average number of fleas per rat	5.3	7.4	5.0	1.1	7.6	6.3	2.5	15.8	5.9	20.0	22.0	6.9	7.9

It would seem that the cyclone of San Felipe had washed off most of the fleas from the locality. Indeed the indices for the months immediately following the disaster represent the lowest figures recorded during the three years. After a short period, however, the

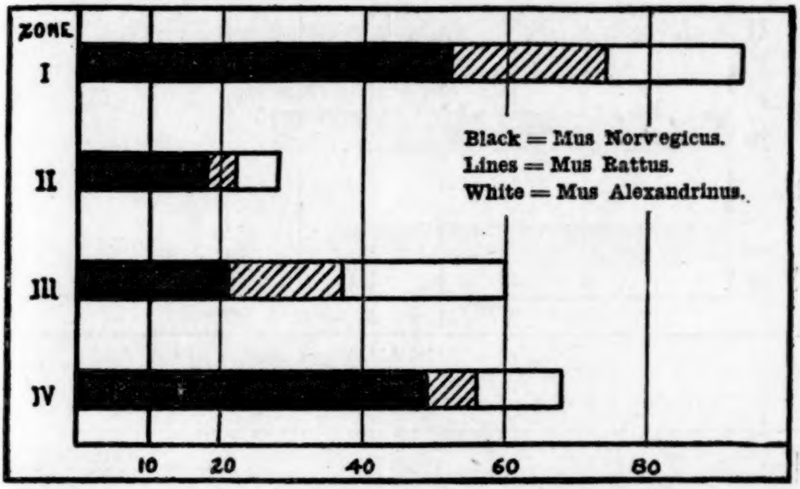

CHART 1.—Number of rats captured in each of four zones

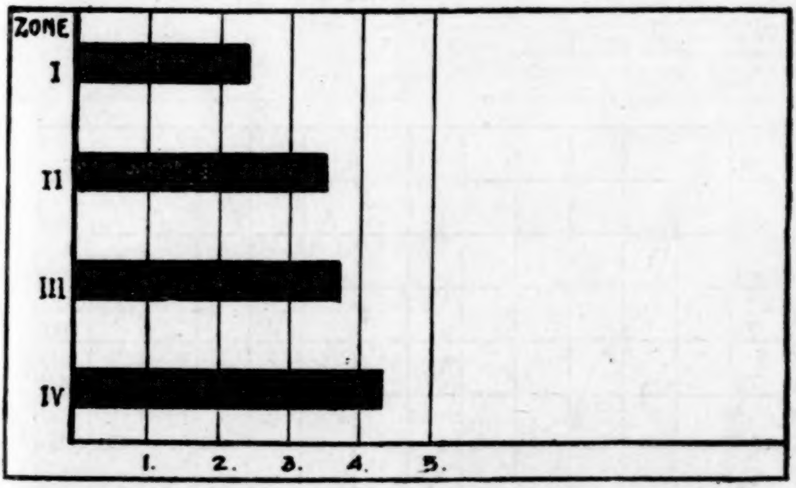

CHART 2.—Proportional concentration of rats in four zones (average number of rats captured per 1,000 traps set)

insects appeared to be more plentiful than ever, the months of April and May showing the highest indices noted by us—20 and 22, respectively.

The comparative flea infestation among the three species of rats is given in Table 6.

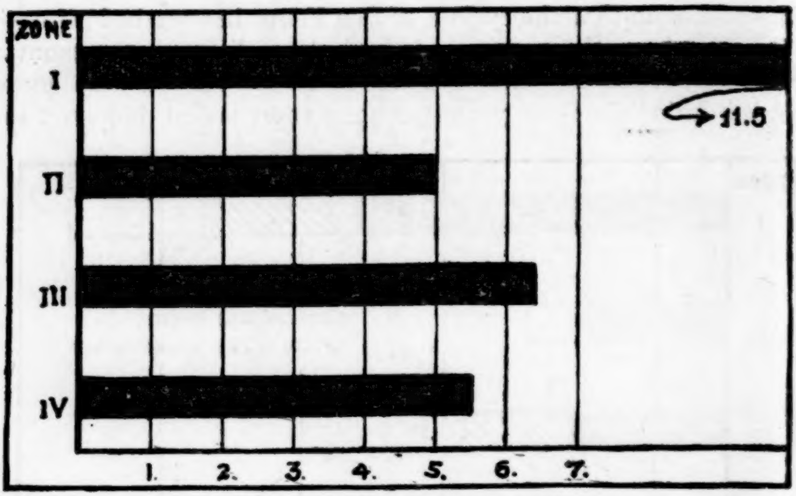

CHART 3.—Flea index in different zones

TABLE 6.—*Flea infestation among various species of rats*

	Decumanus	Rattus	Alexandrinus	Total
Total rats captured	140	49	60	249
Total fleas in each species	947	458	565	1,970
Percentage of rats having fleas	57.1	75.5	86.7	68.0
Average number of fleas per rat	6.8	9.3	9.4	7.9
Average number of fleas per rat last year	5.2	7.1	13.3	6.6
Average number of fleas per rat year before last	7.3	8.6	4.0	7.2

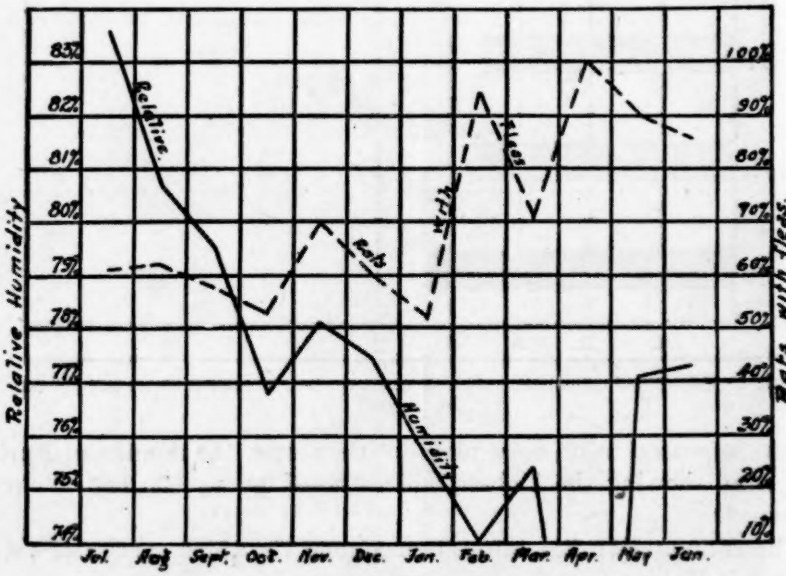

CHART 4.—Relative humidity and percentage of rats with fleas

These results correspond closely with the records for last year, although somewhat at variance with those of the year preceding.

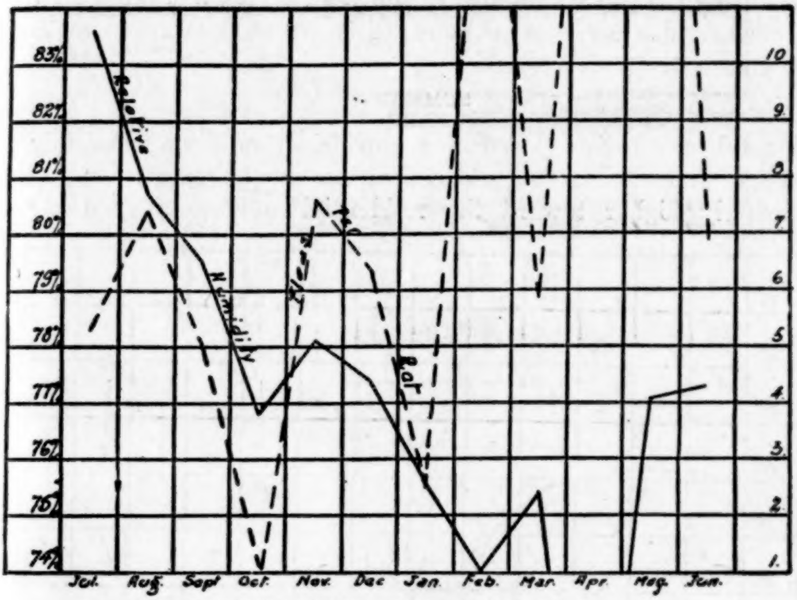

CHART 5.—Relative humidity and number of fleas per rat

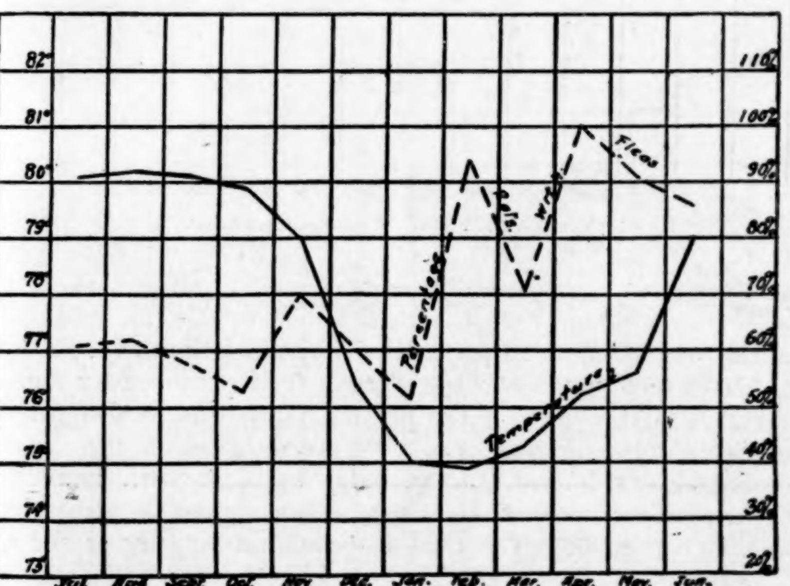

CHART 6.—Temperature and percentage of rats with fleas

So far as the relation of flea prevalence to atmospheric humidity is concerned it will be observed (see Charts 4 and 5) that the two

curves followed each other fairly well during the first half of the period; but a marked dissociation occurred, contrary to our expectation, during the last six months of the year. This was probably due to a considerable decrease in the rat catch which, for various reasons, took place after the cyclone.

SUMMARY

A total of 249 live rats were trapped in San Juan from July 1, 1928, to June 30, 1929. Concentration of the species has been moderately higher toward the residential and commercial zones.

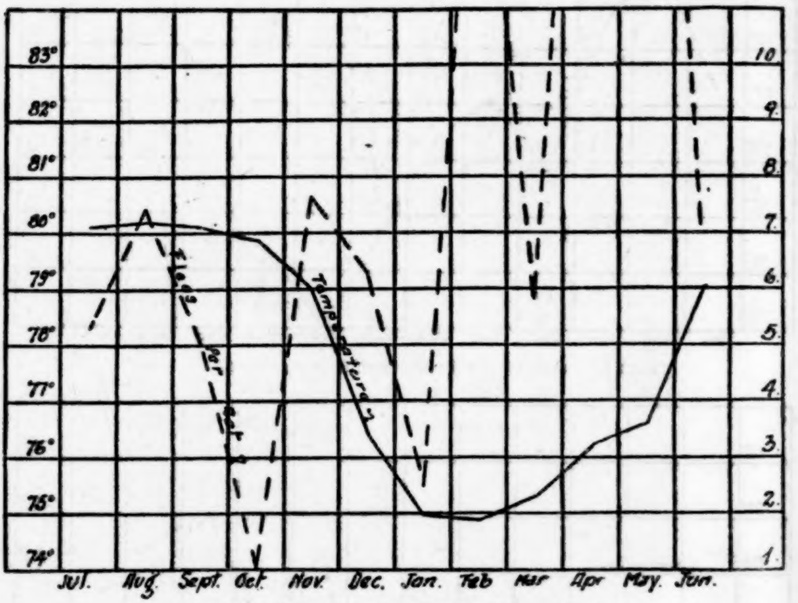

CHART 7.—Temperature and number of fleas per rat

The Norwegian rat practically predominated in all sections of the city.

Fleas were found on 68 per cent of the rodents captured. A total of 1,970 of these parasites was collected, their concentration appearing highest at the docks. The flea index reached 7.9 fleas per rat, and the cheopis index was 7.7. A few specimens of the three species *Echidnophaga gallinacea*, *Ctenocephalus canis* or *felis*, and *Pulex irritans* were encountered. The flea prevalence and the atmospheric humidity curves showed marked dissociation during the second half of the year.

We propose to give a summary of the three years' work as a whole and to comment on the general results of the survey in a future publication.

EXPERIMENTAL STUDIES OF WATER PURIFICATION

IV. Observations on the Effects of Certain Modifications in Coagulation-Sedimentation on the Bacterial Efficiency of Preliminary Water Treatment in Connection with Rapid Sand Filtration

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A. Observed Effect of Variations in the Period of Sedimentation

INTRODUCTORY

The experimental observations recorded in this paper were made during the years 1926, 1927, and 1928, in connection with a series of experiments designed to test the effects which certain modifications in the preliminary treatment of water, as practiced in conjunction with ordinary rapid sand filtration, may have on the bacterial efficiency of such processes. The more specific objective of the series of experiments of which these observations were a part was to ascertain, as far as possible, the extent to which different elaborations and adjustments in the technique of rapid sand filtration processes of water purification, not involving any radical changes in the design or construction of existing plants of this type, might be expected to increase their bacterial efficiency under various working conditions.

For purposes of these experiments advantage was taken of the availability of a fully equipped large-scale experimental rapid sand water filtration plant, which was constructed by the Public Health Service on the grounds of the Stream Pollution Laboratory at Cincinnati in 1924, with the primary object of checking, under controlled conditions approaching as closely as possible those of normal full-scale plant operation, the results of a series of observational and collective surveys of the efficiency of a selected group of municipal water purification plants treating river waters of the middle-western and eastern States.[1] The experimental plant having served the more immediate purpose above stated,[2] it was decided, after conference with Special Consultant Joseph W. Ellms and with the Board of Consultants[3] of the Public Health Service in stream pollution investigations, to utilize the plant for the further experiments to be described in part in this report.

For observations of this character the experimental plant at Cincinnati was exceptionally well adapted, both because of certain features of its design, incorporated with a special view to experi-

[1] The results of these surveys have been published in Public Health Bulletins Nos. 172 and 193, also in the Public Health Reports, issues of Mar. 31, 1922, pp. 741–753 (Reprint No. 737), and Jan. 30, 1925, pp. 202–213 (Reprint No. 987).

[2] For a description of the experimental plant and a discussion of the results of the primary series of experiments, reference is made to the Public Health Reports, issues of Oct. 1, 1926, pp. 2121–2146 (Reprint No. 1114) and July 15, 1927, pp. 1841–1859 (Reprint No. 1170).

[3] The personnel of this board consists of Dr. W. H. Frost, Dr. Edwin O. Jordan, Mr. Langdon Pearse Prof. Earle B. Phelps, and Dr. Lowell J. Reed.

mental work, and because the results of the primary series of experiments had indicated that the performance of this plant paralleled closely, under similar conditions of operation, that of the average full-scale municipal rapid sand filtration plant treating raw waters of the Ohio River type. Under these circumstances the results obtained from the experimental plant would be expected to be applicable, without any substantial modification, to those of full-scale water-purification practice.

The particular features of the experimental plant which made it especially suitable for observations such as those described in this report were as follows: (*a*) Provision of facilities for the continuous admixture of sewage or of clear dilution water with Ohio River water in any desired proportions; (*b*) division of the plant into two parallel sections throughout, each section capable of being operated independently of the other; (*c*) interconnection of the several plant units so as to allow a maximum degree of flexibility in the operation of various combinations of units; and (*d*) continuous wastage of the plant effluent into a near-by sewer, obviating any possibility of danger to water consumers resulting from the experiments. With the arrangements above described, the character of the raw water can be adjusted arbitrarily to almost any required turbidity or bacterial content, and parallel observations, under identical physical conditions, can be made simultaneously on the same raw water with any two different kinds or degrees of treatment, subject to certain limitations which will be noted later in this report.

In the experiments to be described under the general title of this paper, the observations were confined to those factors which may exert a possible influence on the bacterial efficiency of preliminary coagulation and sedimentation. In the first section of the paper, here presented, the observed effects of variations in the period of sedimentation will be discussed. The second section, to be presented closely following this one, will deal with the effects of certain modifications in the conditions surrounding the coagulation process. In succeeding papers of the series, the results of observations made during the years 1927 and 1928, respectively, on the influence of raw-water prechlorination and excess-lime treatment on the bacterial efficiency of the rapid sand filtration process will be described in the order named.

It long has been recognized that a definite relationship exists between the period of subsidence provided in sedimentation basins and the proportion of the suspended matter removed by such basins. Among the more extensive observations made in this country, those of Weston,[4] conducted at New Orleans nearly 30 years ago, in connection with experiments on the purification of Mississippi River

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[4] Water Works Handbook, Flinn-Bogert-Weston, p. 688.

water, and, very recently, those of Bull and Darby,[5] have been especially notable. In these and other similar studies attention has been devoted largely, however, to the removal of turbidity, or suspended matter, rather than to the removal of bacteria. In the experiments under this heading herein recorded, primary consideration was given to bacterial removal, in line with the objectives of these studies.

The conditions under which these observations were made were modified very considerably by the arrangement of the sedimentation basin and filters, as originally incorporated in the design of the experimental plant for purposes of the primary series of experiments. In order to permit the parallel operation of the two sections of the plant, as previously indicated, the sedimentation basin is divided longitudinally into two equal compartments, each provided with separate inlet and outlet connections leading to the two filters. The two basin compartments can be operated either in parallel, connected separately to the two filters, or in series, connected to one or both filters. With the several combinations of the basin compartments and filters it is possible to secure nominal periods of sedimentation approximating 3, 6, 9, or 12 hours, respectively, with a standard rate of filtration equivalent to 2 gallons per square foot per minute. The cnly combination in which two different sedimentation periods can be obtained simultaneously is one in which the two basin compartments are operated in series with each other and half of the total flow diverted to one filter at the outlet end of the first compartment, the remaining half passing on through the second compartment and thence to the second filter. With this arrangement the nominal period of sedimentation in the first compartment is 3 hours and in the second 6 hours, the total period for water passing through both compartments being 9 hours.

With the single exception above noted, it was necessary, in these experiments, to make the comparative observations of bacterial removal with different periods of sedimentation at various times, rather than simultaneously, a limitation which increased very considerably the difficulty of obtaining strictly comparable results, because of changing conditions not subject to absolute control. In the early stages of the experiments, an endeavor was made to offset this difficulty by making each series of observations, with varying periods of sedimentation, over comparatively short intervals of time, such as a week, during which the physical conditions surrounding the observations remained fairly constant. The results of these observations were not entirely satisfactory, however, as the "lag" effects produced by frequent changes in the sedimentation period disturbed

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[5] Sedimentation Studies of Turbid River Waters. Bull, A. W., and Darby, G. M. Jour. Am. W. W. Assoc., vol. 19, No. 3, Mar., 1928, pp. 284-305.

the normal performance of the basin very perceptibly. After a number of trials this method of procedure was abandoned in favor of more extensive series of observations, with each one of the various periods of sedimentation sustained over a considerable interval of time. From these observations fairly comparable results with different sedimentation periods could be secured by selecting and classifying the data according to definitely restricted ranges of those variable conditions, notably raw-water bacterial content, which in themselves influence the efficiency of bacterial removal.

Inasmuch as the experimental plant ordinarily is operated with a nominal period of sedimentation approximating six hours, and as a long series of observations using this period had been made, both in connection with and following the primary experiments,[6] it was considered unnecessary to extend this particular series any further in connection with the more special observations herein recorded, which were confined, therefore, to a study of the comparative results obtained with sedimentation periods approximating 3, 9, and 12 hours, respectively. Two series of experiments were made with these three periods, one (designated as Series A) being made over a period of 56 test days, with parallel observations of the results obtained simultaneously from treatment of the same raw water after three and nine hours of sedimentation, respectively, and the other (designated as Series B) being made over a period aggregating 25 days, with a period of sedimentation approximating 12 hours. The Series A observations were made largely in September and October, 1926, and those of Series B at various times during the spring and autumn of the same year. The total number of laboratory observations, each involving the examination of a complete set of raw-water and effluent samples, aggregated about 200 in Series A and about 100 in Series B.

In conducting these experiments an effort was made to maintain all conditions of treatment of the water as nearly constant as practicable, consistent with normal operating practice. In general, the amounts of coagulant were regulated in accordance with variations in the turbidity of the raw water, so as to produce, after coagulation and sedimentation, an "applied" water having a turbidity falling within a comparatively narrow range, usually below 25 parts per million. The rate of filtration was held constant at 2 gallons per square foot per minute (125,000,000 gallons per acre daily) throughout the experiments.

The results of the experiments have been summarized in two tables, Nos. 1 and 2, the former containing the 37° C. plate count data, and the latter, giving the corresponding *B. coli* results. In the upper portion of each table are given the results of the Series A

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[6] See Reprint No. 1114 from the Public Health Reports, pp. 12 et seq.

observations, with sedimentation periods approximating 3 and 9 hours, and in the lower portion, those of the Series B experiments, with a sedimentation period of 12 hours. In both instances the mean results for each test day, as observed both in the raw water and, simultaneously, in the applied and filtered effluents, were classified and averaged according to the numbers of raw-water bacteria falling into various ranges forming a continuous series of ascending magnitude, using the same method of "grouping" as previously followed in analyzing the data of these studies.[7] The ranges of raw-water bacteria used in classifying the results of the Series A experiments did not coincide with those followed in the case of Series B, because the bacterial densities occurring in the raw water were of a lower order of magnitude in the latter series than in the former. In order to compare the relative proportions of turbidity and of bacterial removal under parallel conditions, the corresponding average turbidities of the raw and applied waters, as determined on the same samples for which the bacterial figures are given under each group, have been added to each table.

TABLE 1.—*Comparative numbers and residual percentages of bacterial count observed in applied and filtered waters, with different periods of sedimentation*

SERIES A. SEDIMENTATION PERIODS, THREE AND NINE HOURS (PARALLEL OBSERVATIONS, WITH SAME RAW WATER)

Raw-water count range	Sedimentation period	Bacterial count, 37° C., 24 hours					Turbidity		
		Average count per c. c.			Per cent of raw in—		P. P. M.		Per cent of raw
		Raw	Applied	Filtered	Applied	Filtered	Raw	Applied	
	Hours								
0-10,000	3	7,030	1,260	141.0	18.0	2.00	241	15.0	6.2
	9	7,030	940	141.0	13.4	2.00	241	4.8	2.0
10,000-20,000	3	12,900	3,440	337.0	26.6	2.60	239	34.0	14.2
	9	12,900	2,840	244.0	22.0	1.90	230	14.0	5.9
20,001-40,000	3	29,200	7,780	802.0	26.6	2.70	180	18.0	10.0
	9	29,200	4,490	403.0	15.4	1.40	180	4.9	2.7
40,001-80,000	3	65,800	10,400	2,590.0	15.8	3.90	297	35.0	11.8
	9	65,800	7,230	1,590.0	11.0	2.40	297	13.0	4.4
Over 80,000	3	278,000	48,200	17,700.0	17.4	6.40	228	7.0	3.1
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SERIES B. SEDIMENTATION PERIOD, 12 HOURS (SEPARATE OBSERVATIONS)

0-2,500	12	1,720	276	18.8	16.1	1.09	163	32	19.6
2,501-5,000	12	3,720	350	19.0	9.4	.51	256	31	12.1
Over 5,000	12	6,470	519	20.0	8.0	.31	506	15	3.0

[7] See Public Health Bulletin No. 172, pp. 18-19.

TABLE 2.—*Comparative numbers and residual percentages of B. coli and turbidity in effluents produced from same raw water after three and nine hours of sedimentation*

SERIES A. SEDIMENTATION PERIODS, THREE AND NINE HOURS (PARALLEL OBSERVATIONS, WITH SAME RAW WATER)

Raw-water index range	Sedimentation period	B. coli index per 100 c. c.					Turbidity		
		Average index per 100 c. c.			Per cent of raw in—		P. P. M.		Per cent of raw
		Raw	Applied	Filtered	Applied	Filtered	Raw	Applied	
	Hours								
0-10,000	3	8,520	3,080	31.0	36.2	0.36	205	5.4	2.6
	9	8,520	1,720	31.0	20.2	.36	205	5.4	2.6
10,001-50,000	3	33,900	6,930	221.0	20.4	.65	263	21.4	8.1
	9	33,900	5,200	87.0	15.3	.26	263	11.0	4.2
50,001-100,000	3	71,300	23,100	464.0	32.4	.65	187	11.0	5.9
	9	71,300	14,100	234.0	19.7	.33	187	5.7	3.0
100,001-500,000	3	420,000	95,700	1,300.0	22.8	.31	77	4.2	5.5
	9	420,000	47,100	72.0	11.2	.017	77	1.7	2.2
500,001-1,000,000	3	775,000	196,000	11,000.0	25.3	1.42	287	24.0	8.4
	9	775,000	98,500	2,420.0	12.7	.31	287	12.0	4.2
Over 1,000,000	3	4,073,000	675,000	21,700.0	16.6	.53	509	79.0	15.5
	9	4,073,000	400,000	8,250.0	9.8	.20	509	28.0	5.5

SERIES B. SEDIMENTATION PERIOD, 12 HOURS (SEPARATE OBSERVATIONS)

0-5,000	12	2,070	482	10.8	23.3	0.52	332.0	11.0	3.3
5,001-10,000	12	7,190	1,190	5.4	16.5	.07	210.0	13.0	6.2
Over 10,000	12	426,000	32,500	291.0	7.6	.07	5.5	4.0	73.0

The results obtained from the experiments of Series A, being based on a larger number of observations covering a longer period, and also having afforded a comparison of the bacterial efficiencies shown with two different sedimentation periods in treating the same raw water under exactly parallel conditions, were more satisfactory from every standpoint than those of Series B. On referring to Tables 1 and 2, it will be noted that the efficiencies of bacterial and turbidity removal were consistently higher with the sedimentation period of nine hours than with that of three hours. In general the proportion of turbidity removed by coagulation and sedimentation was shown to be distinctly higher at both periods than the corresponding proportion of bacteria removed, though this tendency is not shown quite as consistently in the results of the Series B observations. The bacterial removal accomplished by sedimentation and filtration combined, which is indicated by the residual percentages of bacteria in the filtered effluent, does not show as consistently wide a margin in favor of the longer sedimentation period as is true of sedimentation alone, indicating that the efficiency of filtration, as a separate stage of treatment, probably was impaired slightly by reason of the larger pro-

portion of the total burden of purification assumed by sedimentation with the longer period of retention of water in the basin.

In order to show more clearly the comparative bacterial efficiencies of sedimentation observed with different periods of retention of water in the basin, the raw-water bacterial counts at 37° C., as given in Table 1, have been plotted, as in Figure 1, against the corresponding counts observed in the applied water, coincidently with the three different periods of sedimentation, using logarithmic abscissa and ordinate scales. In this chart the plotted points have been connected

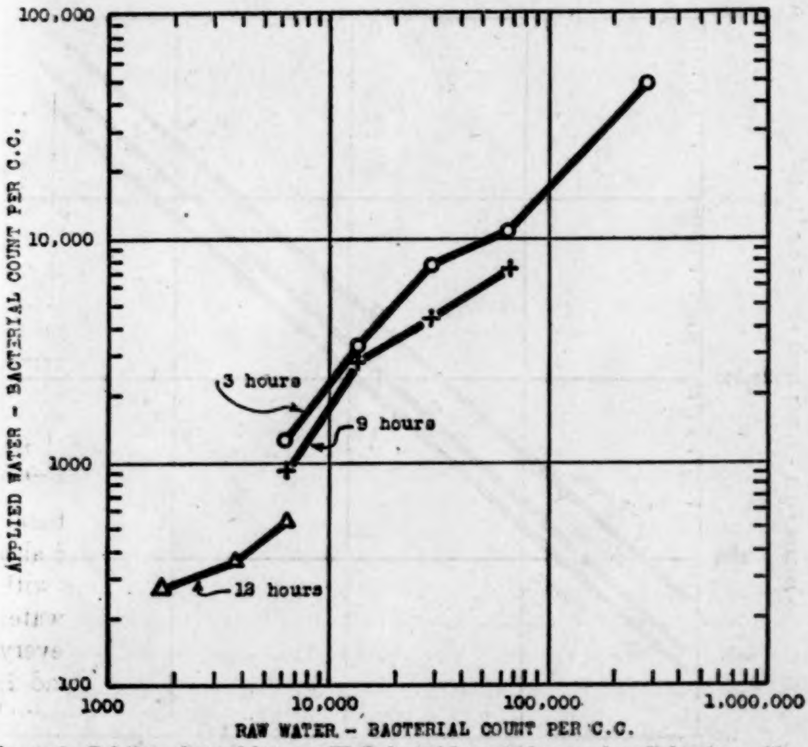

FIGURE 1.—Relations observed between 37° C. bacterial count of raw and applied waters, with nominal sedimentation periods of 3, 9, and 12 hours, respectively. (Plot of data given in Table No. 1)

merely by broken lines, in order to indicate their general trend. On referring to the chart it will be noted that the plots of the parallel observations made with three and nine hours of sedimentation show consistently a margin of advantage in favor of the latter period. The 12-hour plot, though in this case failing to overlap the other two sufficiently to afford a direct comparison, has a decidedly lower trend than the latter, indicating roughly a higher efficiency of bacterial removal in the lower ranges of bacterial density.

A similar plot of the *B. coli* data given in Table 2, which is shown in Figure 2, was much more satisfactory for purposes of comparison,

both because the plotted points were more regular in their trend and because the plot based on the 12-hour sedimentation period observations overlapped the range of the other two plots sufficiently to afford a basis for their direct comparison. In this case the alignment of the plotted points, though marked by one decided irregularity in the case of the 3-hour observations, followed straight-line trends so closely that their courses could be represented very fairly by straight rather than broken lines. The relative positions of these straight lines, as shown in the chart, are approximately parallel to each other

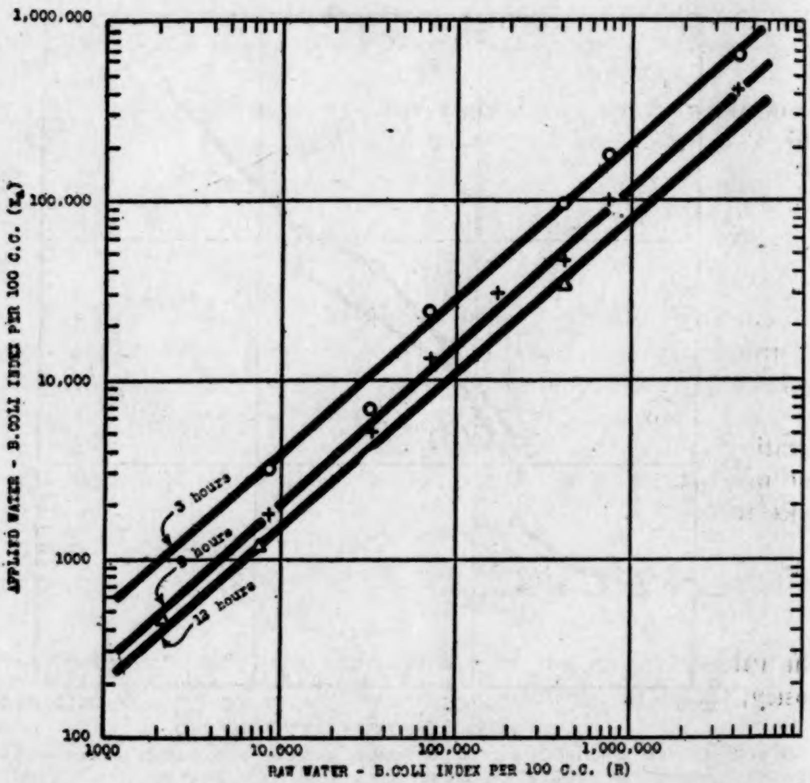

FIGURE 2.—Relations observed between *B. coli* index of raw and applied waters, with nominal sedimentation periods of 3, 9, and 12 hours, respectively. (Plot of data given in Table No. 2)

and lower on the ordinate scale with increased periods of sedimentation, indicating that the proportionate degree of variability in the bacterial quality of the applied water was about the same at all three sedimentation periods, but that the general level of bacterial efficiency thereby represented was consistently higher with the longer periods of sedimentation.

From the slopes and positions of the three lines, the respective equations of the relationships represented by them were readily obtained from Figure 2. Denoting as (*R*) the *B. coli* index of the

raw water and as (E_a) the corresponding *B. coli* index of the applied water, and bearing in mind that both abscissa and ordinate scales are logarithmic, the general equation of the lines is:

$$\log E_a = n \log R + \log c$$

in which (n) is the slope of the line and log c its linear intercept on the (E_a) scale when log R equals unity. Clearing the equation of logarithms, we then have

$$E_a = cR^n$$

which is the same as that which previously was found in these studies to represent the relationship between the bacterial quality of influent and effluent waters of water-purification processes.[8] From Figure 2 the following equations of the three lines were derived, the values of (c) and (n) being determined as above indicated:

Sedimentation period, 3 hours: $E_a = 1.20\ R^{0.88}$ (1)
Sedimentation period, 9 hours: $E_a = 0.60\ R^{0.88}$ (2)
Sedimentation period, 12 hours: $E_a = 0.53\ R^{0.87}$ (3)

A comparison of these three equations was made with a view to determining whether they could be combined into a single equation connecting the values of their constants with the period of sedimentation. It was found that the product of the value of (c) in each equation and the logarithm of the corresponding period of sedimentation was equal to a quantity practically constant for the three equations; thus,

$$1.20 \times \log\ 3 = 0.573$$
$$0.60 \times \log\ 9 = 0.571$$
$$0.53 \times \log\ 12 = 0.572$$

The value of (c) in any one of the equations was represented very closely, therefore, by the expression

$$c = \left(\frac{0.572}{\log T}\right)$$

in which 0.572 is the mean of the products above given and (T) denotes the period of sedimentation in hours. As the value of (n) in the three equations was nearly constant, its mean value, 0.88, was taken as the value of (n) in the combined equation, which thus became:

$$E_a = \frac{0.572}{\log T} R^{0.88} \quad (4)$$

[8] See Public Health Bulletin No. 172, pp. 31-32 and 124-133.

Although equation (4) represents only a rough approximation of a more general relationship connecting the bacterial efficiency of coagulation-sedimentation with the period of sedimentation, it was useful as a means of estimating very roughly the extent to which the efficiency of *B. coli* removal by this preliminary stage of treatment might become modified by interpolating or extrapolating the period of sedimentation between or beyond those at which the observations were made.

An indication of the trend of such efficiency with reference to the sedimentation period is given in Figure 3, in which the numbers of

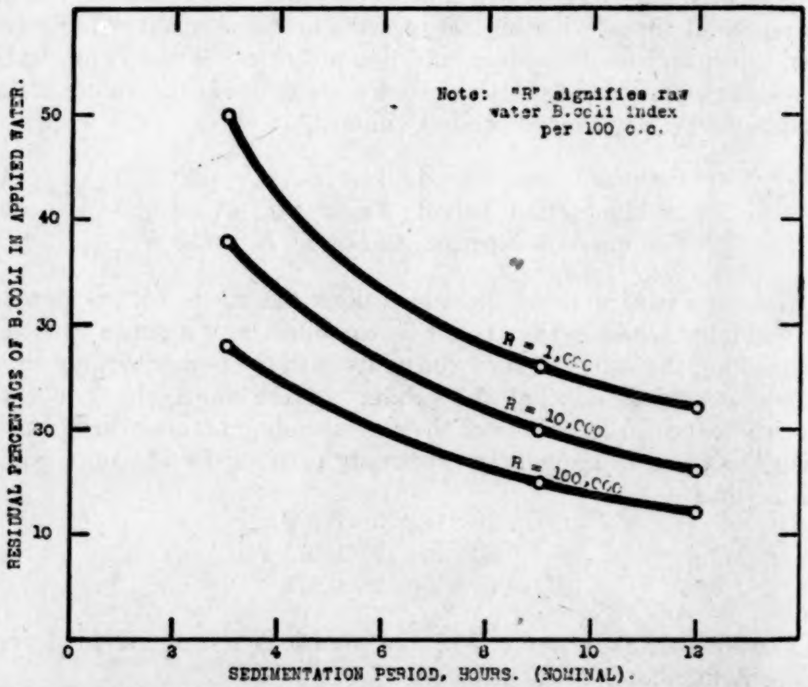

FIGURE 3.—Relation between period of sedimentation and residual percentages of raw water *B. coli* in applied water, corresponding to indicated numbers of raw water *B. coli*. (Derived from plots shown in Figure 2)

B. coli in the applied water corresponding to raw-water numbers of 1,000, 10,000, and 100,000, respectively, as taken from the relationship lines in Figure 2, have been converted to residual percentages of these raw-water numbers. In Figure 3 it will be noted that as the period of sedimentation approaches 12 hours, the residual percentage curves show a definite trend toward diminishing slopes, tending to become asymptotic to horizontal lines, the positions of which probably represent approximately the maximum efficiencies attainable with more prolonged sedimentation periods. Very considerable gains in bacterial efficiency are shown to occur, however, with sedimentation

periods ranging up to eight or nine hours, the increase being more manifest with the lower densities of raw water *B. coli*.

Although the foregoing observations were concerned primarily with the bacterial efficiency of preliminary coagulation-sedimentation, it was of interest in this connection to consider the effects which variations in the period of sedimentation were indicated as having on the bacterial quality of the unchlorinated and the chlorinated filter effluents of the experimental plant. Because of the limited extent of these particular observations, the relationships observed directly

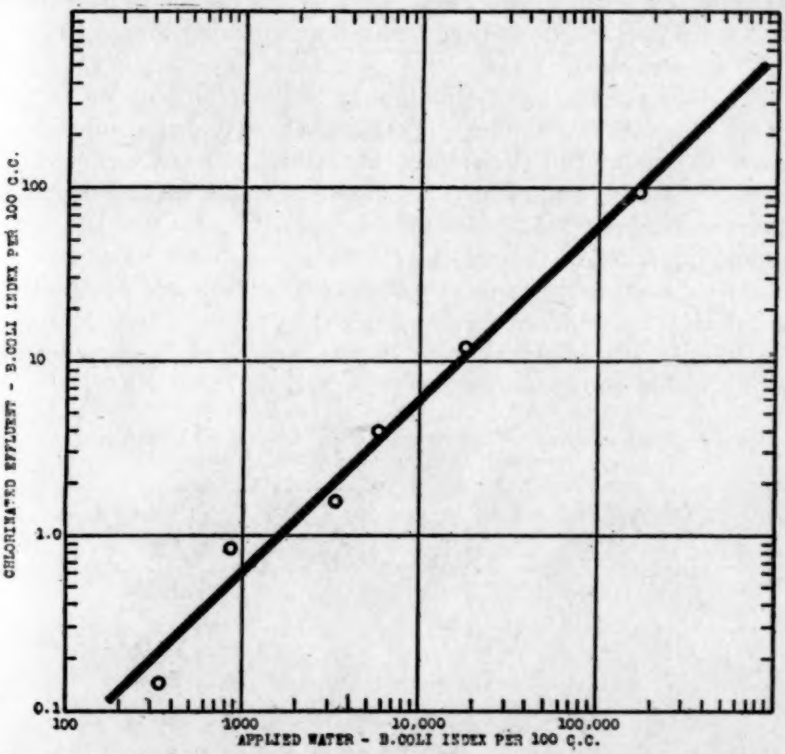

FIGURE 4.—Relation between *B. coli* index of applied water and corresponding index of chlorinated filter effluent. (Based on data given in Table No. 3)

between the bacterial quality of the raw water and that of the two effluents indicated were not defined with sufficient clearness to permit a sharp differentiation of their trends with various sedimentation periods, as was the case in Figure 2, though a fairly consistent divergence is shown in Tables 1 and 2 between the bacterial qualities of the unchlorinated filter effluent observed coincidently with sedimentation periods of three and nine hours, respectively.

A more satisfactory method of dealing with this phase of the problem was afforded by the results of the more extensive observa-

tions made in connection with the primary series of experiments, which afforded a basis for defining not only the relationships between the bacterial quality of the raw water and that of the several effluents, as described in previous reports of this series,[9] but also the corresponding relationships between the quality of the water applied to the filters and that of the unchlorinated and chlorinated filter effluents. By using either one of these relationships in combination with those shown in Figure 2, it thus was possible to estimate the extent to which the bacterial content of one or the other of the two filter effluents indicated might be expected to be modified by differences in the period of sedimentation, affecting the quality of the water applied to the filters.

The results of such an estimate may be illustrated by the following example, in which the effect of varying the sedimentation period on the *B. coli* content of the chlorinated filtered effluent was calculated. In Table 3 and, graphically, in Figure 4 is shown the relationship observed between the *B. coli* index of the applied water and the corresponding index of the chlorinated filtered effluent, as derived from data of the primary series of experiments embracing a period of 15 months. This relationship was derived by grouping the *B. coli* data according to the daily average *B. coli* indices of the applied water falling within the various ranges specified in Table 3.

TABLE 3.—*Relations observed between B. coli index of applied water and corresponding index of chlorinated filter effluent*

Applied water B. coli index range	Average B. coli index		Residual per cent in chlorinated	Applied water B. coli index range	Average B. coli index		Residual per cent in chlorinated
	Applied	Chlorinated			Applied	Chlorinated	
0–750	356	0.14	0.039	5,001–7,500	5,840	4.0	0.068
751–1,000	888	.86	.097	7,501–50,000	18,400	12.0	.065
1,001–5,000	3,480	1.5	.043	Over 50,000	167,000	95.0	.057

The plot of the relationship given in Figure 4, which is based on the corresponding group averages in Table 3, indicates a high degree of correlation between the *B. coli* content of the applied water and chlorinated effluent. As the slope of the relationship line was equal, in this case, to unity (i. e., $n=1$), it was indicated that the relation thus observed was a straight-line one, in which the *B. coli* index of the chlorinated effluent varied in direct proportion to that of the applied water. From inspection, the value of (c) for the line was readily determined as approximating 0.0006; hence the equation of the relationship was

$$E_c = 0.0006\ E_a \quad (5)$$

[9] See Reprint No. 1114 from the Public Health Reports, Table 1 and Figure 1, pp. 13-14.

in which (E_c) denotes the *B. coli* index of the chlorinated effluent and (E_a) the corresponding *B. coli* index of the applied water. The value of (c) thus derived was checked roughly by noting that the mean of the residual percentages in Table 3 was 0.061 per cent, or 0.00061 in terms of a simple decimal.

Referring to Figure 2, the ordinate (E_a) of each relationship line corresponding to a given abscissal value (R) gives the *B. coli* index of the applied water corresponding to that of the raw water, for the particular period of sedimentation thereby represented. If this ordinate value be referred to the abscissa scale of Figure 4, the corresponding ordinate (E_c) of the relationship line shown in that chart will give the corresponding *B. coli* index of the chlorinated effluent. The same result may be obtained analytically by substituting the equivalent of (E_a), in equation (5), into equations (1), (2), and (3), thus:

$$\frac{E_c}{0.0006} = 1.20\ R^{0.89};\ \text{whence}\ E_c = 0.00072\ R^{0.88} \qquad (6)$$

$$\frac{E_c}{1.0006} = 0.60\ R^{0.90};\ \text{whence}\ E_c = 0.00036\ R^{0.88} \qquad (7)$$

$$\frac{E_c}{0.0006} = 0.53\ R^{0.88};\ \text{whence}\ E_c = 0.000318\ R^{0.87} \qquad (8)$$

From equations (6), (7), and (8), values of the ordinate (E_c) may be calculated for various assumed values of (E_a).

Following the procedure above described, relationship lines connecting the *B. coli* index of the raw water with the corresponding index of the chlorinated effluent, with sedimentation periods approximating 3, 9, and 12 hours, respectively, were drawn as shown in Figure 5. As a check on the rationality of these lines, both as to position and as to slope, a corresponding line based on the more extensive observations made with six hours of sedimentation, in connection with the primary series of experiments, has been transcribed to the chart from a previously published report of these experiments.[10] Both the position and slope of this line are so consistent with those of the other lines as to indicate that the latter probably are fairly representative of the effect of variations in the sedimentation period on the *B. coli* content of the chlorinated effluent, in spite of the indirect method by which they were derived.

Following the same procedure as in the case of Figure 2, a rough approximation to a general equation connecting values of (c) and (n)

[10] Reprint No. 1114, Public Health Reports, Figure 1, p. 14. (For this line, $c=0.0008$ and $n=0.82$.)

in equations (6), (7), and (8) with the nominal period of sedimentation was derived, this equation being

$$E_c = \frac{0.000344}{\log T} R^{0.88} \tag{9}$$

The relationship defined by equation (9), though probably not capable of generalized application without further experimental verification under conditions other than those described in this report,

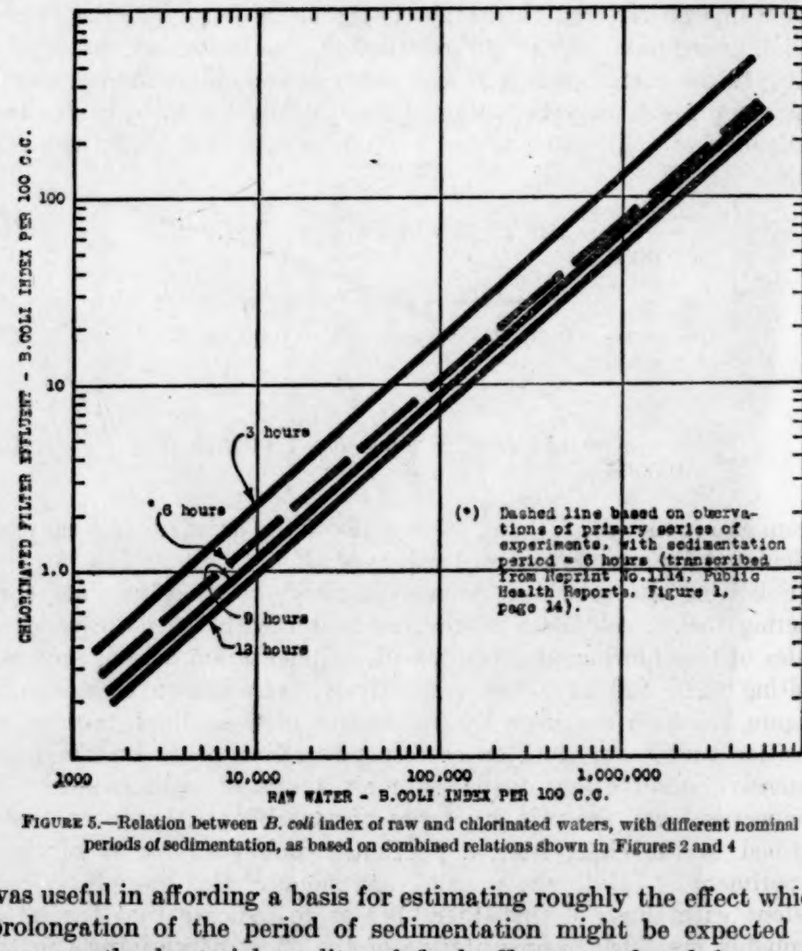

FIGURE 5.—Relation between *B. coli* index of raw and chlorinated waters, with different nominal periods of sedimentation, as based on combined relations shown in Figures 2 and 4

was useful in affording a basis for estimating roughly the effect which prolongation of the period of sedimentation might be expected to have on the bacterial quality of final effluent produced from raw water of the same *B. coli* content, or, conversely, on the limiting *B. coli* index of the raw water corresponding to a quality of effluent falling within the limit of a given standard. In the latter connection the following estimate thus was made of the maximum raw water *B. coli* index yielding a quality of chlorinated filtered effluent meeting

the primary requirement of the revised Treasury Department *B. coli* standard, coincidently with various specified periods of sedimentation:

Period of sedimentation, hours (T)	Maximum permissible raw water B. coli index per 100 c. c.
3	3,700
6	6,200
9	8,300
12	9,600
24	12,600
48	15,600

On referring to a plot of this relationship, as given in Figure 6, it will be noted that the permissible raw water *B. coli* maximum in-

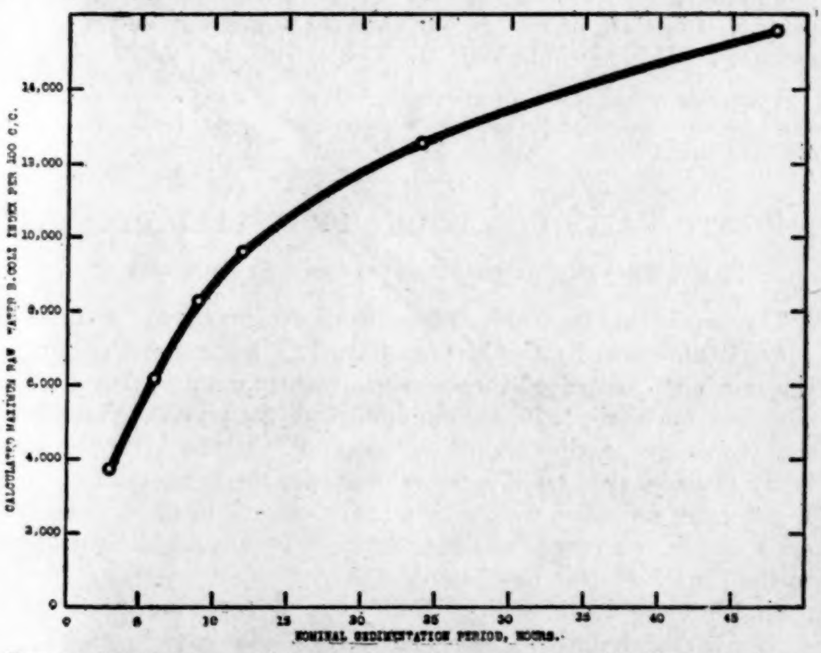

FIGURE 6.—Relation between the nominal period of sedimentation and the calculated maximum raw water *B. coli* index corresponding to a chlorinated filter effluent index not exceeding 1.0 per 100 cubic centimeters. (Calculation made by means of Equation 9)

creases with the period of sedimentation very considerably up to an index of about 10,000, corresponding to a period slightly over 12 hours, but at a rapidly diminishing rate for longer periods. Interpreting these results broadly, it would appear that substantial gains in the permissible limit of raw water pollution could be effected by prolonging the sedimentation period up to approximately 12 hours, but that further extension of the period beyond this time probably would not add sufficiently to such a limit to justify the increased

basin capacity required. Thus, it is indicated in Figure 6 that a fourfold increase in the sedimentation period from 3 to 12 hours would raise the permissible raw water *B. coli* maximum by 160 per cent, whereas the same proportionate increase from 12 to 48 hours would raise the maximum by only 62 per cent.

Without undertaking here to analyze the factors of relative cost involved in the foregoing question, it may be stated, in so far as is indicated by the results of these experiments, that the economical limiting period of sedimentation for Ohio River water after coagulation appears to lie somewhere between 8 and 12 hours, as expressed in terms of nominal retention. As previously noted, very considerable increases in the bacterial efficiency of coagulation-sedimentation were observed with periods ranging as high as eight hours, which represent somewhat longer retention times than ordinarily are provided at full-scale plants, except those at which double-stage treatment of this kind is practiced.

(The second section of this paper, dealing with the effects of certain modifications in conditions surrounding the coagulation process, will appear in the following issue of Public Health Reports.)

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for April, 1930

The accompanying table, taken from the Statistical Bulletin for May, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for April, 1930, as compared with the preceding month and with the corresponding month of last year. It also gives the cumulative rates for the period January–April for the years 1929 and 1930. Death rates are given for the principal causes of death. These rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

In April the death rate for these persons was lower than for the corresponding month of last year, as was the case in each of the preceding months of the current year. In only two years, it is stated, 1927 and 1922, has the April death rate for this group of persons been lower than that for this year. The cumulative death rate for the first four months of 1930 is also much lower than that for the similar period of 1929, and somewhat lower than the figure for the corresponding months of 1928.

The Bulletin states:

While the greatest single factor in this year's more favorable health record has been the decline in the influenza-pneumonia death rate, the most significant items are the cumulative death rates of 85.2 per hundred thousand for tuberculosis (all forms) and 74 for tuberculosis of the respiratory system. These

figures mark a drop since last year in the mortality rate for all forms of tuberculosis of 9.7 per cent and for respiratory tuberculosis of 12.2 per cent. But these declines are even more significant when it is considered that they have occurred in the very part of the year when the mortality from tuberculosis runs highest. So great has been the gain this year that the tuberculosis death rate for the season of highest mortality is at substantially the same figure as recorded for the *whole* year 1929. It is easy to see that when the lower death rates of the summer and fall enter into the computation, the tuberculosis mortality rate for 1930 is destined to fall to a point far below that recorded for any preceding year.

Another outstandingly favorable health development of 1930 is the drop of more than 20 per cent in the mortality from diphtheria. The cumulative death rate for this disease at the end of April, 1930, was far below that for the corresponding period of any preceding year. Improvement is also in evidence for typhoid fever, measles, whooping cough, diabetes, heart disease, respiratory conditions other than pneumonia, diarrheal complaints, chronic nephritis, cancer, puerperal conditions, and accidents. The drop in the cancer death rate is very slight and may be entirely wiped out by figures for later months.

With the exception of the increase in automobile fatalities, no cause of death had shown, up to the end of April, any noteworthy increase over the death rate for the like period of 1929. The death rate from motor vehicle accidents, however, seems destined to go on registering new high points each year.

Death rates (annual basis) per 100,000 for principal causes of death, April, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Causes of death	Death rate per 100,000 lives exposed [1]				
	April, 1930	March, 1930	April, 1929	Cumulative, January-April	
				1930	1929
Total, all causes	975.2	940.6	994.4	955.7	1,113.7
Typhoid fever	1.0	1.1	1.5	1.1	1.5
Measles	6.5	3.6	5.4	4.0	4.2
Scarlet fever	4.1	3.3	4.1	3.8	3.6
Whooping cough	4.4	4.2	5.7	4.7	6.9
Diphtheria	6.2	6.8	9.2	8.2	10.3
Influenza	19.8	25.3	33.1	25.5	99.8
Tuberculosis (all forms)	90.4	86.1	95.5	85.2	94.4
Tuberculosis of respiratory system	77.4	75.4	85.9	74.0	84.3
Cancer	78.5	74.2	76.0	75.7	76.3
Diabetes mellitus	19.6	19.6	19.4	20.5	22.7
Cerebral hemorrhage	65.4	62.9	[2] 60.5	63.6	[2] 64.0
Organic diseases of heart	164.2	159.5	161.7	163.4	175.1
Pneumonia (all forms)	118.7	119.0	111.2	115.3	151.2
Other respiratory diseases	13.5	14.0	13.3	13.2	16.0
Diarrhea and enteritis	11.8	11.1	12.1	11.5	13.3
Bright's disease (chronic nephritis)	76.4	70.7	74.5	72.1	78.1
Puerperal state	10.8	13.1	14.0	12.9	14.7
Suicides	10.3	9.8	9.7	9.2	8.7
Homicides	5.7	7.5	6.5	6.6	6.4
Other external causes (excluding suicides and homicides)	52.4	48.7	57.9	55.7	56.8
Traumatism by automobiles	17.9	13.9	17.2	17.3	15.6
All other causes	215.5	200.1	222.9	203.4	209.7

[1] All figures in this table include infants insured under 1 year of age and are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Statutory provision making compensation for the destruction of tuberculous cattle held not to violate State constitution.—(California Supreme Court; Patrick *v.* Riley, State Controller, 287 P. 455; decided Apr. 21, 1930.) Chapter 829 of the 1929 statutes, known as the "Bovine tuberculosis law," made provision for the examination and tuberculin testing of dairy animals and for the branding, segregation, and slaughter of animals reacting positively to the tuberculin test. Section 10 of said act provided in part as follows:

> * * * In consideration of the fact that the eradication of bovine tuberculosis is beneficial to public health and welfare, that before said animal is branded as provided for in section 9 of this act and/or slaughtered its value shall be determined by appraisement, as provided for herein, * * *; whereupon the owner of said reacting cattle shall be given a written memorandum signed by or under the authority of said director of agriculture in substance and effect, and in behalf of the State of California,-promising that the said State will pay said owner in consideration for the slaughter of said reacting animals, the amount of money herein prescribed therefor. * * *

In a mandamus proceeding to compel the State controller to draw warrants on the State treasurer for the payment of certain claims, evidenced by memoranda such as mentioned in the above-quoted section, the controller based his refusal to draw the warrants on the ground that the provisions authorizing compensation for animals destroyed were in violation of section 31 of article 4 of the State constitution which declared that the legislature shall not "make any gift or authorize the making of any gift, of any public money or thing of value to any individual."

The holding of the supreme court was in favor of the petitioner. Regarding the constitutional provision in question, the court quoted from a prior opinion as follows:

> * * * In other decisions, both prior and subsequent to the Conlin Case, supra, this court has pointed out that, where the question arises as to whether or not a proposed application of public funds is to be deemed a gift within the meaning of that term as used in the constitution, the primary and fundamental subject of inquiry is as to whether the money is to be used for a public or a private purpose. If it is for a public purpose within the jurisdiction of the appropriating board or body, it is not, generally speaking, to be regarded as a gift. * * *

Proceeding then to a discussion of the bovine tuberculosis law, the court said:

> That the act here in question was enacted for a public purpose is beyond question, and, being a law for the suppression of disease and the promotion of the public health, it should be given a broad and liberal construction that it may accomplish the purpose intended in enacting it. [Cases cited.] In construing such an act, the courts must presume that the legislature has carefully investigated and has properly determined that the interests of the public require legislation that will insure the public safety and the public health against threatened danger from diseased animals. The determination of that fact is the province of the

legislature, and not of the courts. It is also the province of the legislature, in the exercise of a sound discretion, to determine what measures are necessary for the protection of such interests. [Cases cited.] We are not prepared to say that the legislature in this act has abused its discretion, or that the measures it has adopted, including the provision for compensation, to prevent the spread of tuberculosis among cattle, are unnecessary and unreasonable or in violation of section 31 of article 4 of the constitution.

* * * The question whether the public interests of the State would be at all advanced by compensating the owners of cattle destroyed under the provisions of the "Bovine tuberculosis law" was an appropriate one for discussion and determination by the legislature before its enactment. * * *

It is our conclusion, therefore, that, while the legislature, in the exercise of the police power, might have directed the slaughter of diseased cattle without making any provision for compensation to the owners, it did not violate section 31 of article 4 of the constitution by refusing to exert the full measure of its might. * * *

DEATHS DURING WEEK ENDED JUNE 21, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended June 21, 1930, and corresponding week of 1929. (From the Weekly health Index, June 25, 1930, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 21, 1930	Corresponding week, 1929
Policies in force	75, 896, 166	74, 409, 722
Number of death claims	13, 544	13, 536
Death claims per 1,000 policies in force, annual rate	9. 3	9. 5

Deaths from all causes in certain large cities of the United States during the week ended June 21, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, June 25, 1930, issued by the Bureau of the Census, Department of Commerce)

City	Week ended June 21, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 21, 1930 [3]
	Total deaths	Death rate [1]		Week ended June 21, 1930	Corresponding week, 1929	
Total (65 cities)	6, 508	11. 4	12. 1	575	648	[3] 50
Akron	37			3	4	27
Albany [4]	27	11. 7	16. 0	2	3	44
Atlanta	82	16. 8	21. 7	11	9	116
White	36			3	4	95
Colored	46	(5)	(5)	8	5	127
Baltimore [4]	164	10. 3	14. 3	13	26	44
White	131			10	16	43
Colored	33	(5)	(5)	3	10	49
Birmingham	63	14. 8	15. 9	3	9	28
White	27			3	5	46
Colored	36	(5)	(5)	0	4	0
Boston	200	13. 0	13. 1	21	19	59
Bridgeport	23			4	6	68
Buffalo	113	10. 6	9. 8	11	12	49
Cambridge	28	11. 6	9. 1	2	2	37
Camden	34	13. 1	10. 8	4	1	73
Canton	19	8. 5	5. 8	0	1	0
Chicago [4]	608	10. 0	12. 1	49	69	43
Cincinnati	130			13	5	77
Cleveland	173	8. 9	9. 8	8	11	24
Columbus	78	13. 6	12. 0	2	4	20

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended June 21, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended June 21, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 21, 1930 [2]
	Total deaths	Death rate [1]		Week ended June 21, 1930	Corresponding week, 1929	
Dallas	61	14.6	18.7	8	10	
White	46			7	7	
Colored	15	(5)	(5)	1	3	
Dayton	48	13.6	13.0	2	4	30
Denver	64	11.3	11.5	6	6	63
Des Moines	27	9.3	11.7	1	3	17
Detroit	263	9.9	11.0	33	37	51
Duluth	22	9.8	12.1	2	3	54
El Paso	33	14.6	19.0	8	13	
Erie	21			0	4	0
Fall River [4]	25	9.7	8.2	4	2	92
Flint	30	10.5	9.1	6	3	70
Fort Worth	33	10.1	11.0	7	3	
White	23			5	2	
Colored	10	(5)	(5)	2	1	
Grand Rapids	41	13.0	13.3	1	6	15
Houston	75			11	6	
White	41			5	4	
Colored	34	(5)	(5)	6	2	
Indianapolis	93	12.7	14.7	3	8	22
White	78			3	7	26
Colored	15	(5)	(5)	0	1	0
Jersey City	50	8.0	10.0	5	8	43
Kansas City, Kans	23	10.1	11.0	2	3	47
White	18			2	1	53
Colored	5	(5)	(5)	0	2	0
Kansas City, Mo	102	13.6	11.5	14	6	109
Knoxville	29	14.3	8.9	5	5	117
White	22			4	4	104
Colored	7	(5)	(5)	1	1	247
Los Angeles	295			20	27	61
Louisville	77	12.2	8.7	5	3	43
White	55			3	1	30
Colored	22	(5)	(5)	2	2	145
Lowell	26			2	4	47
Lynn	27	13.3	9.9	2	3	51
Memphis	81	22.2	18.4	4	6	48
White	44			2	4	37
Colored	37	(5)	(5)	2	2	67
Milwaukee	101	9.7	8.3	11	11	55
Minneapolis	97	11.1	10.3	4	8	26
Nashville	52	19.4	22.0	6	7	93
White	31			6	6	123
Colored	21	(5)	(5)	0	1	0
New Bedford	29			1	2	26
New Haven	49	13.6	10.5	4	1	78
New Orleans	150	18.2	20.2	17	19	98
White	95			12	10	106
Colored	55	(5)	(5)	5	9	84
New York	1,321	11.4	12.0	131	108	55
Bronx boro	179	9.8	10.0	7	9	16
Brooklyn boro	441	10.0	10.1	49	48	52
Manhattan boro	522	15.5	17.6	60	43	98
Queens boro	137	8.4	7.9	11	5	32
Richmond boro	42	14.5	13.5	4	3	74
Newark, N. J	78	8.6	11.9	7	8	37
Oakland	63	12.0	12.6	2	5	24
Oklahoma City	39			6	3	118
Omha	54	12.6	11.9	3	3	34
Paterson	19	6.8	13.3	0	3	0
Philadelphia	415	10.5	11.5	29	33	43
Pittsburgh	147	11.4	15.1	14	15	51
Portland, Oreg	78			2	6	25
Providence	56	10.2	9.5	4	7	37
Richmond	54	14.5	14.2	5	7	74
White	31			2	5	45
Colored	23	(5)	(5)	5	2	131
Rochester	67	10.6	10.6	7	8	62
St. Louis	220	13.5	12.5	13	25	42
St. Paul	53			4	4	41
Salt Lake City [4]	32	12.1	7.9	2	4	31
San Antonio	82	19.6	12.4	18	13	

See footnotes at end of table

Deaths from all causes in certain large cities of the United States during the week ended June 21, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended June 21, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 21, 1930[2]
	Total deaths	Death rate[1]		Week ended June 21, 1930	Corresponding week, 1929	
San Diego	36			0	2	0
San Francisco	132	11.8	11.0	11	12	75
Schenectady	18	10.1	16.2	0	4	0
Seattle	84	11.4	8.0	4	6	40
Somerville	12	6.1	5.6	1	2	33
Spokane	32	15.3	12.9	2	1	52
Springfield, Mass	32	11.1	12.9	3	1	47
Syracuse	46	12.0	9.9	0	4	0
Tacoma	19	9.0	12.7	0	2	0
Toledo	64	10.7	13.8	13	7	119
Trenton	34	12.8	13.1	3	4	56
Utica	21	10.5	14.0	1	2	28
Washington, D. C.	135	12.8	12.6	8	7	46
White	91			7	3	60
Colored	44	(5)	(5)	1	4	18
Waterbury	20			6	1	154
Wilmington, Del	27	11.0	9.7	1	2	23
Worcester	28	7.4	11.9	2	6	26
Yonkers	26	11.2	6.4	2	1	48
Youngstown	23	6.9	8.7	3	4	47

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 73 cities.
[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 21, 1930, and June 22, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 21, 1930, and June 22, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929
New England States:								
Maine	9	1	1	2	47	54	1	2
New Hampshire	1	1			20	60	0	0
Vermont					39	2	0	0
Massachusetts	47	64	1	4	878	374	3	4
Rhode Island	3	3			5	42	0	0
Connecticut	13	20		1	46	152	2	1
Middle Atlantic States:								
New York	111	233	[1] 8	[1] 1	2,025	723	16	15
New Jersey	76	81	1	1	939	173	0	6
Pennsylvania	98	125			1,033	929	3	9
East North Central States:								
Ohio	26	32	3	8	336	442	4	16
Indiana	13	11			134	196	6	2
Illinois	131	207	3	22	390	1,058	6	10
Michigan	75	102	4	1	802	564	12	60
Wisconsin	21	21	12		326	914	5	5
West North Central States:								
Minnesota	10	13	2	2	98	144	2	2
Iowa	6	2			63	74	1	3
Missouri	12	37			59	73	3	8
North Dakota	4	11			11	78	0	1
South Dakota	8	4			90	9	1	0
Nebraska	5	6			75	154	1	0
Kansas	4	6	4		170	316	0	6
South Atlantic States:								
Delaware		1			6	10	0	0
Maryland [2]	12	24	7	12	37	26	0	2
District of Columbia	2	10		1	65	13	1	0
West Virginia	4	6	10		41	134	1	1
North Carolina	11	24	5		54	9	4	1
South Carolina	11	8	137	124			3	0
Georgia	2	8	4	14	56	27	2	0
Florida	7	5		1	38	23	0	1
East South Central States:								
Kentucky						25	2	2
Tennessee	6	2	6	4	47	13	11	2
Alabama	10	17	21	13	111	38	3	2
Mississippi	10	13					0	

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 21, 1930, and June 22, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929
West South Central States:								
Arkansas	3	4	8	6	24	1	0	2
Louisiana	15	12	10	7	7	37	1	2
Oklahoma [3]	4	7	4	23	55	32	2	3
Texas	9	30	11	18	72	91	1	0
Mountain States:								
Montana					21	57	0	5
Idaho	1	1			7	31	1	0
Wyoming	3	1			44	18	0	0
Colorado	2	9		1	286	19	2	1
New Mexico	13	10	1		34	12	2	0
Arizona		4			44	1	2	3
Utah [2]	1		6		129	2	1	2
Pacific States:								
Washington	5	2			383	91	1	4
Oregon	2	11	7	2	103	92	1	4
California	45	58	18	21	1,186	152	4	12

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929
New England States:								
Maine	0	0	14	10	0	0	1	3
New Hampshire	0	0	3	4	0	0	0	0
Vermont	0	0	5	1	0	1	0	0
Massachusetts	1	1	102	148	0	0	2	7
Rhode Island	0	1	5	3	0	0	0	0
Connecticut	0	0	44	25	0	0	1	3
Middle Atlantic States:								
New York	4	2	228	236	14	0	11	12
New Jersey	0	1	104	69	0	0	5	4
Pennsylvania	2	2	253	240	0	0	16	15
East North Central States:								
Ohio	1	0	116	98	79	84	14	0
Indiana	0	0	50	83	124	43	4	1
Illinois	0	0	247	260	53	4	17	11
Michigan	0	1	220	335	75	52	11	2
Wisconsin	0	1	90	78	80	8	4	2
West North Central States:								
Minnesota	0	0	46	43	7	6	0	3
Iowa	0	0	22	38	89	36	0	3
Missouri	0	1	65	34	20	16	3	14
North Dakota	2	1	11	20	4	10	0	0
South Dakota	0	0	2	4	24	17	0	1
Nebraska	0	0	40	22	27	12	2	2
Kansas	0	1	22	20	71	34	8	4
South Atlantic States:								
Delaware	0	0	7	0	0	0	0	1
Maryland [2]	0	0	34	46	0	0	8	7
District of Columbia	0	0	4	7	0	0	1	0
West Virginia	0	0	12	15	12	11	5	8
North Carolina	4	2	9	18	9	11	34	21
South Carolina	3	0	2	3	1	1	62	45
Georgia	0	0	4	3	0		28	33
Florida	0	0	0	6	0		3	2
East South Central States:								
Kentucky	0	0	13	75	3	25	8	5
Tennessee	0	1	17	5	2	1	28	28
Alabama	5	2	16	15	10	0	26	21
Mississippi	0	0	4	3	10	2	28	25

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa and for 1929 are exclusive of Oklahoma City only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 21, 1930, and June 22, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929
West South Central States:								
Arkansas	0	0	2	12	2	2	15	9
Louisiana	27	0	24	13	0	11	30	16
Oklahoma [3]	0	0	7	14	57	76	4	17
Texas	2	0	11	21	107	66	7	27
Mountain States:								
Montana	1	0	24	20	4	4	2	5
Idaho	0	0	0	2	1	7	0	0
Wyoming	0	0	0	1	5	5	0	7
Colorado	0	0	17	21	12	10	0	3
New Mexico	0	0	1	6	9	4	3	1
Arizona	2	0	1	0	0	1	1	4
Utah [2]	0	0	8	4	0	7	1	0
Pacific States:								
Washington	0	0	14	17	23	21	5	2
Oregon	0	1	3	5	17	23	2	1
California	51	4	84	259	43	24	12	16

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa, and for 1929 are exclusive of Oklahoma City only.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1930										
Delaware	2	10			59		0	38	0	2
May, 1930										
Arkansas	9	11	90	189	207	93	0	21	21	8
Idaho	12	5			201		0	30	25	2
Illinois	42	544	109	8	2,602		3	1,640	451	42
Indiana	34	60	56		800	1	2	594	680	18
Maine	4	13	26		402		0	132	0	19
Maryland	9	83	52		382		2	334	0	21
Michigan	91	260	16	2	7,309		1	1,056	269	16
Minnesota	11	48	3		882		1	475	31	11
Missouri	38	160	16	46	617	1	0	618	292	38
New Mexico	9	18		8	210	2	2	42	38	11
New York	59	507		9	10,613		8	1,974	29	61
Ohio	18	200	61	2	3,193		6	1,023	502	44
Pennsylvania	64	527		5	6,805	1	2	1,843	2	53
Rhode Island	1	22			75		0	93	0	9
South Carolina		112	1,402	1,783	284	1,209	9	25	16	103
West Virginia	7	37	58		416		0	107	159	57

April, 1930	Cases
Delaware:	
Chicken pox	35
Mumps	2
Undulant fever	1
Whooping cough	17
May, 1930	
Actinomycosis:	
Pennsylvania	1
Anthrax:	
New York	3
Pennsylvania	4
Chicken pox:	
Arkansas	61
Idaho	67
Illinois	1,180
Indiana	299
Maine	102
Maryland	661

Chickenpox—Continued.	Cases
Michigan	985
Minnesota	570
Missouri	383
New Mexico	56
New York	2,072
Ohio	1,513
Pennsylvania	2,360
Rhode Island	108
South Carolina	378
West Virginia	204
Conjunctivitis:	
Maine	5
New Mexico	2
Dengue:	
South Carolina	2
Diarrhea:	
Maryland	2
South Carolina	3,138
Diarrhea and enteritis (under 2 years):	
Ohio	19
Dysentery:	
Illinois	9
Maryland	7
Minnesota (amebic)	3
New York	7
Ohio	4
Food poisoning:	
Ohio	11
German measles:	
Illinois	290
Maine	113
Maryland	423
New York	1,733
Ohio	117
Rhode Island	105
South Carolina	44
Glandular fever:	
Maryland	1
Hookworm disease:	
Arkansas	4
South Carolina	138
Impetigo contagiosa:	
Maryland	2
Jamaica ginger paralysis:	
Arkansas	4
South Carolina	1
Lead poisoning:	
Illinois	6
Ohio	13
Pennsylvania	3
Leprosy:	
Illinois	1
Lethargic encephalitis:	
Illinois	6
Michigan	2
New Mexico	2
New York	22
Ohio	4
Pennysylvania	5
South Carolina	1

Mumps:	Cases
Arkansas	33
Idaho	39
Illinois	897
Indiana	55
Maine	426
Maryland	95
Michigan	925
Missouri	268
New Mexico	188
New York	2,310
Ohio	670
Pennsylvania	1,529
Rhode Island	2
South Carolina	209
Ophthalmia neonatorum:	
Illinois	35
Maryland	2
Missouri	4
New York	2
Ohio	101
Pennsylavnia	8
South Carolina	12
Paratyphoid fever:	
Illinois	2
Maine	3
Maryland	1
Minnesota	1
New York	12
South Carolina	5
Puerperal septicemia:	
Illinois	7
New York	8
Ohio	9
South Carolina	5
Rabies in animals:	
Idaho	1
Illinois	7
Maryland	3
Missouri	9
New Mexico	1
New York	17
Rhode Island	9
South Carolina	18
Rabies in man:	
Michigan	1
Rocky Mountain spotted or tick fever:	
Idaho	7
Scabies:	
Maryland	2
Septic sore throat:	
Idaho	1
Illinois	9
Maine	4
Maryland	6
Michigan	21
Missouri	21
New York	16
Ohio	52
Tetanus:	
Illinois	6
New York	3
Ohio	3
Pennsylvania	9
South Carolina	1

	Cases
Trachoma:	
Arkansas	4
Illinois	5
Missouri	52
New York	3
Ohio	2
Pennsylvania	1
Rhode Island	1
Trichinosis:	
Pennsylvania	3
Tularaemia:	
Arkansas	1
Idaho	1
South Carolina	1
Typhus fever:	
Maryland	1
New York	1
Undulant fever:	
Illinois	6
Indiana	6
Maine	1
Maryland	1
Michigan	1
Minnesota	8
Missouri	8
New York	13

	Cases
Undulant fever—Continued.	
Ohio	37
Pennsylvania	4
South Carolina	1
Vincents, angina:	
Illinois	5
Maine	3
Maryland	12
New York	86
Whooping cough:	
Arkansas	117
Idaho	28
Illinois	736
Indiana	173
Maine	105
Maryland	161
Michigan	863
Minnesota	202
Missouri	188
New Mexico	4
New York	1,642
Ohio	683
Pennsylvania	1,011
Rhode Island	51
South Carolina	611
West Virginia	201

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,825,000. The estimated population of the 87 cities reporting deaths is more than 30,235,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 14, 1930, and June 15, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	900	1,186	
94 cities	488	646	729
Measles:			
45 States	13,103	10,215	
94 cities	5,116	2,888	
Meningococcus meningitis:			
46 States	118	202	
94 cities	39	90	
Poliomyelitis:			
47 States	70	30	
Scarlet fever:			
46 States	2,635	2,881	
94 cities	1,176	1,140	836
Smallpox:			
46 States	1,071	851	
94 cities	79	94	46
Typhoid fever:			
46 States	407	460	
94 cities	57	53	54
Deaths reported			
Influenza and pneumonia:			
87 cities	531	527	
Smallpox:			
87 cities	0	0	

City reports for week ended June 14, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	13	1	1		0	15	37	1
New Hampshire:								
Concord	0	0	0		0	0	0	1
Manchester								
Nashua	0	1	0		0	3	0	0
Vermont:								
Barre		0						
Burlington	2	0	0		0	0	0	1
Massachusetts:								
Boston	61	33	8		0	453	38	16
Fall River	1	3	2		0	1	5	0
Springfield	9	2	4		0	9	3	0
Worcester	57	2	0		0	112	0	0
Rhode Island:								
Pawtucket	6	0	0		0	3	0	0
Providence	16	4	0	1	1	20	0	6
Connecticut:								
Bridgeport	6	5	0		0	5	1	5
Hartford	7	4	1		0	3	0	4
New Haven	8	1	0		0	9	14	3
MIDDLE ATLANTIC								
New York:								
Buffalo	28	10	10		0	3	23	10
New York	189	236	102	4	6	1,664	160	124
Rochester	9	8	3		0	20	7	1
Syracuse	14	3	0		0	38	48	3
New Jersey:								
Camden	1	6	2		0	8	0	0
Newark	18	11	16	2	0	121	12	7
Trenton	4	2	10		0	6	0	4
Pennsylvania:								
Philadelphia	81	53	19		3	277	79	34
Pittsburgh	22	15	10		1	140	10	27
Reading	7	2	0		0	1	11	2
Scranton								
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	5	3		1	57	10	4
Cleveland	98	23	16	4	2	26	41	16
Columbus	10	2	6	1	1	43	3	2
Toledo	26	4	0		0	24	8	2
Indiana:								
Fort Wayne	3	1	0		0	2	0	0
Indianapolis	18	2	0		0	28	1	9
South Bend	1	0	0		0	2	0	0
Terre Haute	0	0	0		0	42	0	5
Illinois:								
Chicago	104	82	133	9	4	29	85	35
Springfield	2	0	1		0	20	0	0
Michigan:								
Detroit	61	40	46	1	1	296	65	21
Flint	6	2	0		0	161	1	1
Grand Rapids	7	1	0		0	1	3	5

City reports for week ended June 14, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	5	0	0		0	1	2	2
Madison	1	0	0		0	5	1	2
Milwaukee	93	11	1		0	16	119	7
Racine	9	0	0	1	1	6	2	0
Superior	0	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	5	1	0		0	9	1	5
Minneapolis	60	11	1		0	20	26	7
St. Paul	25	6	1		0	4	0	3
Iowa:								
Davenport	0	1	0			0	0	
Des Moines	0	1	0			0	0	
Sioux City	2	0	0			15	0	
Waterloo	3	0	0			0	0	
Missouri:								
Kansas City	8	2	0		1	2	1	6
St. Joseph	1	0	0		0	0	0	0
St. Louis	21	25	22			33	16	
North Dakota:								
Fargo	1	0	1		0	5	11	1
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	2	0	0			42	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Lincoln	26	1	0		0	2	2	0
Omaha		2						
Kansas:								
Topeka	13	0	0	1	4	30	10	1
Wichita	1	1	1		0	60	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	0	0		0	1	0	1
Maryland:								
Baltimore	80	18	8	2	0	11	5	11
Cumberland	0	0	1		0	1	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	28	7	3		0	56	0	13
Virginia:								
Lynchburg	4	1	1		0	12	0	0
Norfolk	5	0	1		0	3	3	2
Richmond	1	2	3		1	2	0	1
Roanoke	3	0	0		0	61	0	0
West Virginia:								
Charleston	3	0	0		0	2	0	0
Wheeling	1	0	0		0	5	1	0
North Carolina:								
Raleigh	0	0	0		0	0	0	0
Wilmington	2	0	0		0	0	0	1
Winston-Salem		0						
South Carolina:								
Charleston	0	0	0	7	0	0	0	2
Columbia	1	0	0		0	0	4	0
Georgia:								
Atlanta	6	1	1	3	0	20	6	5
Brunswick	0	0	0		0	2	0	0
Savannah	0	0	2		0	2	2	2
Florida:								
Miami	0	1	1		0	11	0	2
St. Petersburg		0			0			1
Tampa	0	1	2		0	23	1	2

City reports for week ended June 14, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0	----------	0	0	0	1
Tennessee:								
Memphis	9	1	2	----------	0	0	0	4
Nashville	2	0	0	1	1	18	1	2
Alabama:								
Birmingham	2	1	0	1	1	9	3	6
Mobile	0	0	0	----------	0	0	0	2
Montgomery	0	1	0	0	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	1	2	----------	----------	9	0	----------
Little Rock	1	0	0	----------	0	1	0	0
Louisiana:								
New Orleans	0	5	18	2	2	1	0	9
Shreveport	0	1	0	----------	0	1	2	0
Oklahoma:								
Oklahoma City	0	0	0	6	0	0	3	4
Tulsa	2	0	0	----------	----------	1	0	----------
Texas:								
Dallas	4	3	3	2	2	12	2	5
Fort Worth	1	1	0	----------	1	11	1	3
Galveston	0	0	0	----------	0	0	0	3
Houston	2	2	0	----------	0	2	0	7
San Antonio	0	2	0	----------	3	1	0	4
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	16	0	1
Great Falls	3	0	0	----------	0	1	1	0
Helena	0	0	0	----------	0	0	0	1
Missoula	0	0	0	----------	0	3	0	0
Idaho:								
Boise	1	0	0	----------	0	4	0	2
Colorado:								
Denver	14	8	4	----------	0	149	20	5
Pueblo	1	1	0	----------	0	37	30	0
New Mexico:								
Albuquerque	2	0	0	----------	0	9	0	0
Arizona:								
Phoenix	0	1	0	----------	0	3	0	1
Utah:								
Salt Lake City	7	3	0	----------	0	176	7	1
Nevada:								
Reno	----------	0	----------	----------	----------	----------	----------	----------
PACIFIC								
Washington:								
Seattle	23	3	1	----------	----------	209	62	----------
Spokane	13	2	0	----------	----------	47	0	----------
Tacoma	2	2	0	----------	0	98	0	2
Oregon:								
Portland	7	6	4	----------	0	39	6	5
Salem	1	0	0	----------	0	2	2	0
California:								
Los Angeles	46	31	9	7	1	235	76	18
Sacramento	0	3	1	----------	0	20	18	1
San Francisco	44	12	7	----------	1	53	57	2

City reports for week ended June 14, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	1	0	0	0	0	1	0	0	11	22
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	8
Manchester											
Nashua	1	0	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0		0				0				
Burlington	0	0	0	0	0	0	0	0	0	0	15
Massachusetts:											
Boston	50	51	0	0	0	10	2	1	0	38	178
Fall River	3	2	0	0	0	2	0	1	0	3	19
Springfield	4	5	0	0	0	0	0	0	0	5	23
Worcester	6	9	0	0	0	0	0	0	0	4	36
Rhode Island:											
Pawtucket	1	2	0	0	0	0	0	0	0	3	13
Providence	6	9	0	0	0	2	1	2	0	5	51
Connecticut:											
Bridgeport	6	3	0	0	0	2	0	0	0	0	23
Hartford	3	4	0	0	0	1	0	0	0	2	45
New Haven	3	4	0	0	0	1	0	0	0	5	36
MIDDLE ATLANTIC											
New York:											
Buffalo	20	20	0	0	0	5	0	0	0	15	107
New York	174	143	0	0	0	122	11	12	3	79	1,460
Rochester	8	8	0	0	0	4	0	1	0	4	62
Syracuse	5	9	0	1	0	2	0	0	0	40	47
New Jersey:											
Camden	4	6	0	0	0	3	0	1	0	1	33
Newark	19	18	0	0	0	6	0	0	0	22	13
Trenton	2	4	0	0	0	3	0	0	0	1	30
Pennsylvania:											
Philadelphia	63	86	0	0	0	43	2	3	1	29	500
Pittsburgh	24	28	0	0	0	8	0	0	0	34	176
Reading	2	3	0	0	0	0	0	0	0	7	20
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	9	9	2	3	0	9	1	0	0	5	108
Cleveland	28	40	0	2	0	17	1	0	0	70	183
Columbus	4	10	1	0	0	7	0	0	1	5	80
Toledo	8	19	0	1	0	3	1	1	0	6	50
Indiana:											
Fort Wayne	1	6	1	1	0	1	0	1	0	2	30
Indianapolis	6	17	6	6	0	4	0	0	0	5	
South Bend	2	6	1	0	0	2	0	0	0	0	27
Terre Haute	1	0	0	0	0	0	0	0	0	0	16
Illinois:											
Chicago	84	217	2	0	0	47	2	4	1	79	677
Springfield	2	2	0	0	0	1	0	1	1	2	14
Michigan:											
Detroit	69	120	1	2	0	38	2	0	0	112	292
Flint	7	14	1	3	0	2	0	1	0	31	20
Grand Rapids	4	15	0	0	0	0	0	0	0	3	26
Wisconsin:											
Kenosha	1	0	0	0	0	0	0	0	0	4	8
Madison	1	2	0	0	0	3	0	0	0	11	21
Milwaukee	18	23	2	0	0	12	0	0	0	44	118
Racine	2	5	0	0	0	0	0	0	0	4	11
Superior	3	1	0	0	0	0	0	0	0	0	12
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	1	0	0	0	2	0	0	0	17	33
Minneapolis	24	13	2	1	0	6	0	0	0	6	103
St. Paul	15	8	0	0	0	3	0	0	0	2	70

City reports for week ended June 14, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Iowa:											
Davenport	0	1	0	24	-------	-------	0	0	-------	0	-------
Des Moines	4	2	2	9	-------	-------	0	0	-------	0	36
Sioux City	0	6	0	4	-------	-------	0	0	-------	1	1
Waterloo	1	0	0	1	-------	-------	0	0	-------	1	-------
Missouri:											
Kansas City	6	14	0	2	0	3	0	0	0	12	90
St. Joseph	0	2	1	2	0	2	0	0	0	0	31
St. Louis	17	67	1	5	0	10	2	2	1	6	205
North Dakota:											
Fargo	1	1	0	0	0	0	0	0	0	7	-------
Grand Forks	1	0	0	1	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	3	-------	-------	0	0	-------	2	-------
Sioux Falls	0	1	0	5	-------	-------	0	0	-------	0	7
Nebraska:											
Lincoln	1	7	1	1	0	0	0	0	0	17	-------
Omaha	2	-------	2	-------	-------	-------	0	-------	-------	-------	-------
Kansas:											
Topeka	1	1	0	3	0	1	0	1	0	14	14
Wichita	1	4	1	0	0	1	0	0	0	3	25
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	5	0	0	0	1	0	0	0	0	29
Maryland:											
Baltimore	21	36	0	0	0	15	2	1	0	25	161
Cumberland	0	0	0	0	0	2	0	0	0	0	13
Frederick	0	0	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	14	16	0	0	0	16	1	0	0	1	146
Virginia:											
Lynchburg	1	1	0	0	0	2	0	1	0	3	14
Norfolk	1	1	0	0	0	1	0	1	0	8	-------
Richmond	1	7	0	0	0	6	0	0	0	0	45
Roanoke	0	0	0	0	0	1	1	0	0	3	24
West Virginia:											
Charleston	0	1	1	0	0	2	0	0	0	5	16
Wheeling	2	0	0	0	0	1	0	0	0	1	14
North Carolina:											
Raleigh	0	1	0	4	0	0	0	0	1	1	10
Wilmington	0	0	0	0	0	0	0	0	0	15	10
Winston-Salem	0	-------	1	-------	-------	-------	1	-------	-------	-------	-------
South Carolina:											
Charleston	0	0	1	0	0	1	1	0	0	0	19
Columbia	0	0	0	0	0	1	2	1	1	2	16
Georgia:											
Atlanta	3	8	3	0	0	5	2	1	0	13	76
Brunswick	0	0	0	0	0	0	0	0	0	0	10
Savannah	1	2	0	0	0	0	1	3	0	0	30
Florida:											
Miami	1	0	0	0	0	1	0	0	0	0	22
St. Petersburg	0	-------	0	-------	0	0	0	-------	0	-------	7
Tampa	0	2	0	0	0	0	0	1	0	0	19
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	1	1	0	0	1	0	0	0	0	15
Tennessee:											
Memphis	2	5	1	1	0	10	3	2	0	11	80
Nashville	1	0	0	5	0	4	1	1	0	0	37
Alabama:											
Birmingham	1	0	3	0	0	5	2	0	0	4	84
Mobile	0	0	0	0	0	1	0	1	0	0	24
Montgomery	0	2	0	0	-------	-------	0	0	-------	0	-------

City reports for week ended June 14, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		4	
Little Rock	1	0	0	0	0	0	1	0	0	0	
Louisiana:											
New Orleans	3	4	0	0	0	16	3	3	1	2	145
Shreveport	0	1	1	0	0	4	1	0	0	2	30
Oklahoma:											
Oklahoma City	1	4	2	21	0	5	0	0	0	0	45
Tulsa	0	3	1	2			1	2		0	
Texas:											
Dallas	2	3	1	2	0	5	1	1	0	15	67
Fort Worth	1	1	1	1	0	2	1	0	0	0	40
Galveston	0	0	0	0	0	0	0	0	0	0	15
Houston	1	2	1	4	0	5	1	0	0	0	85
San Antonio	0	0	0	0	0	6	0	1	0	0	91
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	10
Great Falls	1	10	0	0	0	0	0	0	0	1	7
Helena	0	0	0	0	0	0	0	0	0	1	2
Missoula	0	0	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	1	0	0	0	0	0	0	0	0	0	8
Colorado:											
Denver	7	4	0	2	0	7	0	1	0	72	70
Pueblo	1	0	0	0	0	1	0	0	0	3	11
New Mexico:											
Albuquerque	0	1	0	0	0	1	0	0	0	0	8
Arizona:											
Phoenix	0	0	0	0	0	5	1	0	0	2	18
Utah:											
Salt Lake City	2	0	1	1	0	4	1	0	0	49	34
Nevada:											
Reno	0		0				0				
PACIFIC											
Washington:											
Seattle	5	6	1	4			1	2		5	
Spokane	4	0	3	8			1	0		32	
Tacoma	2	1	2	1	0	1	0	0	0	3	29
Oregon:											
Portland	4	3	7	3	0	1	1	3	0	15	59
Salem	1	1	0	0	0	0	0	0	0	11	
California:											
Los Angeles	24	23	3	6	0	23	1	2	0	28	252
Sacramento	2	3	1	5	0	1	1	2	0	1	25
San Francisco	14	15	0	0	0	12	1	2	0	2	136

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	2	0	0	0	0	0	0	0
Worcester	1	0	0	0	0	0	0	0	0
Rhode Island:									
Providence	0	1	0	1	0	0	0	0	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	1	0

City reports for week ended June 14, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
Buffalo	2	1	0	0	0	0	0	0	0
New York	10	6	0	1	0	0	2	1	0
Pennsylvania:									
Philadelphia	1	0	0	0	0	0	0	0	0
Pittsburgh	0	1	0	1	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	1	0	0	0	0	0	0	0	0
Toledo	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago	3	3	0	0	0	0	1	0	0
Michigan:									
Detroit	8	4	0	0	1	0	0	0	0
Wisconsin:									
Milwaukee	0	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	1	1	0	0	0	0	0	0	0
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
St. Louis	2	0	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	2	1	0	0	0	1	0
Kansas:									
Topeka	1	0	1	0	0	0	0	1	0
SOUTH ATLANTIC [2]									
District of Columbia:									
Washington	1	0	0	0	0	0	0	0	0
Virginia:									
Norfolk	1	0	0	0	0	0	0	0	0
Richmond	0	1	0	0	0	0	0	0	0
Roanoke	0	0	0	0	0	0	0	1	0
South Carolina:									
Charleston [1]	0	0	0	0	1	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Atlanta	2	2	0	0	4	4	0	0	0
Savannah	0	0	0	0	2	2	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	4	0	0	0	1	0	0	0
Alabama:									
Birmingham	0	0	0	1	0	0	1	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	1	0	0	0	0
Louisiana:									
New Orleans	0	0	0	0	1	0	0	0	0
Shreveport	0	0	0	0	0	0	0	2	0
Oklahoma:									
Oklahoma City	0	0	0	0	2	0	0	0	0
Texas:									
Dallas	0	0	0	0	0	2	0	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
Houston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Montana:									
Billings	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	0	2	0	0	0	0	1	16	1
Sacramento	1	0	0	0	3	0	0	0	0
San Francisco	0	0	0	0	1	0	1	0	0

[1] Dengue: 1 case at Charleston, S. C.

[2] Typhus fever: 1 case at Tampa, Fla.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended June 14, 1930, compared with those for a like period ended June 15, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, May 11 to June 14, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	76	124	81	135	77	124	77	110	[2] 80	103
New England	97	94	62	103	51	90	86	72	[3] 36	79
Middle Atlantic	78	159	80	188	71	168	72	148	82	131
East North Central	91	143	117	165	111	155	113	123	129	145
West North Central	72	123	70	100	76	110	51	96	[4] 54	65
South Atlantic	49	62	49	49	55	41	49	54	[5] 40	64
East South Central	40	27	27	14	40	7	13	21	13	41
West South Central	71	110	56	46	52	57	41	88	86	84
Mountain	34	26	51	61	43	35	60	61	[6] 35	35
Pacific	50	56	69	60	78	58	76	56	43	34

MEASLES CASE RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	1,285	890	1,185	903	932	659	957	734	[2] 838	483
New England	1,688	431	1,719	552	1,423	364	1,452	602	[3] 1,401	337
Middle Atlantic	1,410	196	1,150	196	991	183	1,076	169	1,089	143
East North Central	822	2,138	692	2,286	529	1,597	517	1,827	457	1,152
West North Central	814	1,753	778	1,441	514	1,033	412	1,060	[4] 369	581
South Atlantic	1,123	474	875	242	725	298	478	238	[5] 374	242
East South Central	405	68	641	27	378	55	418	41	182	41
West South Central	788	331	587	430	486	236	123	400	101	209
Mountain	6,479	183	6,934	313	5,527	252	5,630	192	[6] 3,386	261
Pacific	1,949	425	2,544	529	1,630	398	2,220	408	1,564	384

SCARLET FEVER CASE RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	231	290	210	268	186	269	214	209	[2] 193	186
New England	239	247	288	231	281	269	230	191	[3] 200	204
Middle Atlantic	234	220	215	196	171	193	196	135	155	129
East North Central	311	472	229	449	142	447	296	321	304	322
West North Central	256	281	300	208	209	179	260	165	[4] 242	110
South Atlantic	157	210	150	159	115	273	156	300	[5] 149	133
East South Central	27	103	115	137	81	123	108	96	54	75
West South Central	78	179	52	118	15	160	78	76	37	107
Mountain	223	104	292	113	94	96	240	78	[6] 123	70
Pacific	149	297	113	336	83	246	109	270	113	251

SMALLPOX CASE RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	23	11	20	14	16	9	21	8	[2] 13	16
New England	0	0	0	7	0	0	0	0	[3] 0	0
Middle Atlantic	0	0	0	0	1	0	1	0	0	0
East North Central	16	14	10	20	13	15	8	17	11	28
West North Central	123	15	108	15	55	15	116	12	[4] 37	12
South Atlantic	4	2	2	4	9	0	4	2	[5] 8	4
East South Central	81	14	34	27	34	7	34	14	40	55
West South Central	22	50	11	15	15	19	22	8	22	42
Mountain	60	148	69	35	60	52	112	52	[6] 26	44
Pacific	54	14	83	75	57	27	68	14	57	46

See footnotes at end of table.

Summary of weekly reports from cities, May 11 to June 14, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	8	9	7	8	7	7	8	8	[2] 9	9
New England	9	9	18	7	11	2	4	7	[3] 9	11
Middle Atlantic	7	6	4	5	3	3	6	5	8	3
East North Central	2	3	5	3	3	3	4	3	4	4
West North Central	8	6	8	8	9	17	9	8	[4] 6	17
South Atlantic	13	17	11	15	13	19	20	17	[5] 15	11
East South Central	47	0	27	75	40	34	13	27	27	34
West South Central	37	65	11	11	22	19	37	27	19	19
Mountain	0	0	0	17	9	0	0	0	[6] 9	9
Pacific	2	7	7	10	9	2	2	12	19	19

INFLUENZA DEATH RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
91 cities	8	8	6	10	4	7	5	7	[2] 7	6
New England	0	2	4	7	0	7	0	2	[3] 2	7
Middle Atlantic	7	8	8	8	4	4	4	5	5	4
East North Central	4	7	5	8	4	9	4	6	6	8
West North Central	3	0	0	15	3	3	12	3	[4] 17	9
South Atlantic	18	7	5	6	4	6	9	7	[5] 2	2
East South Central	44	30	22	45	37	0	15	22	15	7
West South Central	4	4	8	27	4	12	11	16	27	12
Mountain	9	17	9	9	17	17	9	35	[6] 0	0
Pacific	15	22	6	6	3	16	3	16	6	6

PNEUMONIA DEATH RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
91 cities	104	106	103	116	80	105	86	90	[2] 85	86
New England	102	88	100	121	80	106	73	65	[3] 80	85
Middle Atlantic	130	114	137	129	94	113	106	105	101	98
East North Central	68	115	80	118	54	101	59	96	67	82
West North Central	106	75	83	123	68	120	130	81	[4] 82	54
South Atlantic	156	120	101	94	82	112	93	67	[5] 72	88
East South Central	96	90	88	104	110	112	81	60	110	104
West South Central	84	109	88	66	130	66	84	90	107	62
Mountain	77	13	120	139	77	113	129	61	[6] 88	113
Pacific	58	47	43	82	64	63	40	69	71	60

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930 and 1929, respectively.

[2] Barre, Vt., Omaha, Nebr., Winston-Salem, N. C., and Reno, Nev., not included.

[3] Barre, Vt., not included.

[4] Omaha, Nebr., not included.

[5] Winston-Salem, N. C., not included.

[6] Reno, Nev., not included.

FOREIGN AND INSULAR

AZORES

St. Michaels—Plague.—According to recent information, a case of pneumonic plague was reported to have appeared on April 18, 1930, at San Roque, about a mile from Ponta Delgada, St. Michaels, Azores. Seven infected persons were subsequently placed in the quarantine hospital, five of whom died of the disease. Energetic measures have been taken against the disease, and no new cases have been reported in the infected region since April 26.

An erroneous report in a European newspaper gave the number of cases of plague for the week ended January 4, 1930, as 16, whereas in reality there were 9 cases and 5 deaths from both bubonic and pneumonic plague reported for that week at Ponta Carca, and Ribeira Grande.

CANADA

Provinces—Communicable diseases—Week ended June 7, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended June 7, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		1				1
New Brunswick [1]						
Quebec	1			1		7
Ontario	2	6	1	1	14	7
Manitoba [1]						
Saskatchewan						2
Alberta [1]						
British Columbia	1				1	3
Total	4	7	1	2	15	20

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 14, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended June 14, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Measles	70
Chicken pox	83	Mumps	66
Diphtheria	30	Puerperal septicemia	1
Erysipelas	2	Scarlet fever	69
German measles	43	Tuberculosis	40
Influenza	1	Typhoid fever	7
Lethargic encephalitis	1	Whooping cough	24

CZECHOSLOVAKIA

Communicable diseases—April, 1930.—During the month of April, 1930, communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	5		Puerperal fever	68	21
Cerebrospinal meningitis	14	9	Scarlet fever	1,525	50
Diphtheria	1,626	122	Trachoma	281	
Dysentery	2		Typhoid fever	404	35
Malaria	9		Typhus fever	29	
Paratyphoid fever	10				

TRINIDAD (BRITISH WEST INDIES)

Port of Spain—Vital statistics (comparative)—April, 1930.—The following statistics for the month of April for the years 1929 and 1930 are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	April, 1929	April, 1930		April, 1929	April 1930
Number of births	150	171	Death rate per 1,000 population	19.6	19.9
Birth rate per 1,000 population	27.5	30.9	Deaths under 1 year	16	12
Number of deaths	106	110	Infant mortality rate per 1,000 births	106.7	70.2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930		
						12	19	26	3	10	17	24	31	7	14	21
China:																
Canton	C										1	1	1			
Manchuria—Dairen	C			1												
Swatow	C												3		3	
India	C	12,350	6,461	5,914	10,817		7,436	15,870								
	D	6,507	3,606	3,371	5,866		4,345	10,403								
Bassein	C					3	1	1	2	3	4					
	D					2	1	1	1	3	2					
Bombay	C				4											
Calcutta	C	138	202	269	354	137	165	165	180	194	175	142	98			
	D	90	110	153	220	85	118	118	93	125	107	83	57			
Negapatam	C	1	12												1	
	D	1	4												1	
Rangoon	C	6	3	3	2				1		5	2	2	1		
	D	5	3	1	2				1		1		2	1		
Tuticorin	C	35	3													
	D	9	1													
India (French):																
Chandernagor	C	1		4	1	1	2		3	2						
	D	1		2	3			4	1	1	4					
Karikal	C	1		4	12		1									
	D			1	9		1									
Indo-China (see also table below):																
Pnompenh	C	3	11	9				2		1				5		
	D	3	8	7	6						2	2	1	1		
Saigon and Cholon	C	1	2	5	14	17	12	19	28	59	40	48	13	17		
	D	1	2	4	6	10	10	13	22	43	27	24	7	11		
Philippine Islands:																
Bulacan Prov.—Malolos	C													1		
	D													1		
Cebu—																
Bantayan	C													3	8	53
	D													3	7	28

Bogo	C														1	3
	D														1	1
Santa Fe	C													1		
	D													1		
Leyte Prov.—Maripipi	C														1	15
	D															11
Manila	C											[1] 1	1			
Negros—																
Bacolod	C															9
	D															8
Cadiz	C												10	2	10	
	D												7	1	5	
Escalante	C													1		
	D													1		
Hays Calatrava	C															3
	D															2
San Remigio	C															3
	D															2
Talisay	C															7
	D															7
Pampanga Prov.—Angeles	C															1
Rizal—Navotas	C													1		
	D													1		
San Antonio	C														1	
	D														1	
Siam	C	11	3	7	1	8	7	3		12	4	6			1	
	D	2		4		6	3	2		10	2	2			1	
Bangkok	C	9	3	2	2	1	5	4	5			6	3	5		
	D	1			1	1	2	1				2	1			
Nagara Pathom	C			1				4	6							
	D			1				2								
On vessel:																
S. S. at Suva, Fiji Islands	C			1												
S. S. Sutley, at Batavia, from Calcutta	C			1												
S. S. Sassari, at Massoua, from Jeddah	C												1			
	D												1			
On small boat at Port Cebu, from Bantayan Island	C													1		
	D													1		

Place		December, 1929	January, 1930			February, 1930			March, 1930			April, 1930			May, 1930	
			1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20
Indo-China (French) (see also table above):																
Annam [1]	C		1			2	2			52				60		20
Cambodia [2]	C	41	71		76	41	3	46	49	32		18	6			31
Cochin-China [1]	C	46	67		110	64	39	21	5	22	55	48				224

[1] Reports incomplete.

[2] Diagnosis not confirmed.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	April, 1930 19	April, 1930 26	May, 1930 3	May, 1930 10	May, 1930 17	May, 1930 24	May, 1930 31	June, 1930 7	June, 1930 14	June, 1930 21
Argentina:																
Andalgala.[1]																
Rosario	C		P													
Sante Fe	C		6													
Villa Lia	D			2												
Azores: Ponta Delgada	C	P														
Brazil:																
Rio de Janeiro	C		1													
	D		1													
Sao Paulo.[2]																
British East Africa (see also table below):																
Tanganyika	C			7			11	33								
	D						10	10								
Uganda	C	127	82	47	98	27	20	23								
	D	112	70	43	87	27	19	21								
Ceylon:																
Colombo	C	2	4	3	4			1		4	1		1			
	D	1	4	3	4			1		3	1		1			
Plague-infected rats			1	3	2	2			2							
Chile: Antofagasta	C		1	1	1				1							
	D				2				1							
Dutch East Indies:																
Batavia and West Java	C	286	167	153	124	27	16	20	1							
	D	280	164	150	122	27	16	20								
Plague-infected rats			3	3	3		6	2				3	2			
Celebes—Makassar	C		1													
	D		1													
Plague-infected rodents		4														
East Java and Madura	C	2														
	D	2														
Java and Madura	D	458	317	296	223	59	40			8						
Ecuador (see table below).																

Egypt:																
Alexandria	C	2	4	1	4			1	1	2	3	3	5	3	6	6
	D	3	1		1			1	1			1	2			2
Assiout	C	4						7	7	3	9	2	6	4	2	3
	D	2						3	2		3	1	1		1	
Assuan	C	2														
Beheira	C		2		4											
Beni Suef	C				4											
Dakahlieh	C	1		8	5	2		1	2	3	1	2	5	1		
	D	1			1						1	1				
Gharbieh	C	2	1					1								
	D	1						1								
Girga	C					1										
Minieh	C											6	1	1	1	4
	D												1		1	
Port Said	C					1					1	1		1		
Greece (see also table below):																
Patras	C				1											1
Piraeus	C		1													
Pyrgos	C				1											
India	C	4,713	4,814	5,639	4,087		343	535								
	D	3,093	3,308	3,940	3,344		229	517								
Bassein	C		1		3											
	D		1		1											
Bombay	C		1	1	7		4			4	1					
	D		1	1	5	1	3	4		1	4					
Plague-infected rats		29	28	31	86	20	28	25	35	23	39		19			
Madras Presidency	C	336	27	230	157	12	15	9								
	D	174	13	140	87	6	8	4								
Rangoon	C	3	3	7	3		3		2		1	3				
	D	4	2	6	3		2	1	1	1	1	1				
Plague-infected rats			1	7	3	1	2		1	1	3	1				
India (Portuguese)	D									7						
Indo-China (see also table below):																
Pnompenh	C		1			2			1	1			2			
	D		2	13	13	2	1	1				1				
Saigon and Cholon	C	1	2		1					1				1		
	D	1	2		1											
Iraq:																
Baghdad	C	2	6	6	7		2		4	7	11	7	12	12		8
	D	1	2	1	4				2	3	5	4	6	7		5
Basra	C	1														
Naudham	C	1														
Japan: Osaka (vicinity of)—Plague-infected rats		1	7	6	4	1	1	1								
Kwang-Chow-Wan	C		25	25	7											
Madagascar (see also table below):																
Tamatave	C	4					1									
	D	3														
Morocco	C	12	4	48	55	14	41	34	32	19	22	18				
	D			13	18	6	26	12	11	11	14	6				

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

[2] 21 cases of plague with 8 deaths were reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21
Nigeria: Lagos	C	15	6	7	13					1	1					
	D	15	6	7	5					1	1					
Plague-infected rats		18	44	42	25	3		1		1						
Senegal (see table below).																
Siam	C	11	8	17	16	4		1								
	D	9	6	13	15	4		2								
Bangkok	C	1		1	5						1	1	3			
	D	1		1	4						1		3			
Nagara Pathom	C	6	7	5	1	4	3	2	1							
	D	5	7	6	1	4	3	1	1							
Nagara Rajsima	C	2	2	2	1		1									
	D	1			1		1									
Syria: Beirut	C														1	
Tunisia:																
Sfax district	C	14	18	22				1		17						
Tunis	C	42	6	5	1											
	D	21												1		
Union of Socialist Soviet Republics:																
Kazaks	C	P														
Salsk Region	C													1		
	D													1		
Stavropol Region	C													1		
	D													1		
Union of South Africa:																
Cape Province	C		1	2	1											
	D	7		1	1											
Orange Free State	C	5	15	11	5	1										
	D	1	9	3	3											
Transvaal	C		8	2	1											
	D		3		1											
On vessel:																
At Rio de Janeiro, Brazil, from Argentina	C		1													

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	54	34				
Uganda	C	216	184	109			
	D	199	155	99			
Ecuador: Guayaquil	C	17	4	2	2	0	
	D	6	2	2		0	
Plague-infected rats		13	4	2	2	0	
Ecuador (outside of Guayaquil)	C	19	4				
	D	5	2				
Greece (see also table above)	C	1				1	
Indo-China (see also table above)	C	10	10	30	27	4	
Madagascar (see also table above)	C	264	282				
	D	248	258				
Ambositra Province	C	111	128	49	25		
	D	96	111	41	20		
Antisirabe Province	C	16	26	22	38		
	D	16	25	22	36		
Itasy Province	C	19	31		4		
	D	16	31		4		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Madagascar—Continued.							
Miarinarivo Province	C	3		25	14		
	D	3		25	14		
Moramanga Province	C	12	22	7	5		
	D	12	21	4	5		
Tamatave Province	C	2	3				
	D	2	1				
Tananarive Province	C	97	88	110	52		
	D	98	83	107	52		
Senegal:							
Baol [1]	C	5			18	24	13
	D	2			8	12	11
Dakar [1]	C	8				2	52
	D	1				2	42
Louga [1]	C			2		33	54
	D					10	27
Thies [1]	C		3		3	12	21
	D				2	9	8
Tivaouane [1]	C		1		11	71	135
	D				8	38	69

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	19	26	May, 1930 3	10	17	24	31	June, 1930 7	14	21
Algeria:																
Algiers	C		6	1	5	1					1					
Constantine	C		1													
Oran	C		5		1											
Arabia: Aden	C	1	1	2	3			1								
Bolivia: La Paz (see table below).																
Brazil: Rio de Janeiro	C	1														
British Borneo: Sarawak	C		4	19												
British East Africa (see also table below):																
Tanganyika	C	27	5	49	103											
	D	5		8	7											
British South Africa:																
Southern Rhodesia	C	33	1	6								42				
	D	6										8				
Canada:																
Alberta	C	16	22	4	10	3	1									
Edmonton	C	15	19	1	4	3										
British Columbia—Vancouver	C	17	16	16	20	8	1	5	3			2	2			
Manitoba	C	8	6	2	4	2			2			7	3			
Ontario	C	51	63	86	100	17	30	18	12	14	24	24	20			
Fort William	C		4													
North Bay	C		2	1						1						
Ottawa	C	7	10	11	19	8	4	7	2	3	10	7	5	6		
Toronto	C		2									3	1	2	1	1
Quebec	C	3	11													
Montreal	C		1													
Saskatchewan	C	61	86	76	47	3	10	7	21	20	6	10				
Regina	C	31								1		3				
Ceylon:																
Angoda, Western Province	C			10					6							
	D			1					2							
Colombo	C	1	1	3												
	D			2												

China:																
Canton	C	5	7	11	6		2	1								
	D		2	3	2	1	1		1							
Chungking	C	P	P	P		P	P	P	P	P						
Foochow	C	P	P	P			P		P							
Hong Kong	C	102	118	62	38	20	7		1	5	5	2				
	D	73	109	51	25	11	9	3		4	2	3				
Manchuria—																
Harbin	C	1	3				1									
Kwantung—Dairen	C	1	6	5			1			1		7				
Nanking	C	P	P	P	P	P			P	P						
Shanghai—																
Foreigners only	C	7	5	2	2	2	1				1					
Including natives	D	6	8	7	10	4	3	2	1		1	2	2			
Swatow	D	2	3	6	6	2			1	1						
Tientsin	C	2	1	1	2	1			1	1						
Chosen (see table below).																
Colombia:																
Baranquilla	C	1		102	2	1										
Buenaventura	C	13		1		7	5	2	1	2		1	1			
Costa Rica:																
Port Limon	C					1	1	2	2				2	2		
San Jose [1]	C				10	7										
Curacao (alastrim)	C				14			1	1	2						
Dahomey (see table below).																
Dutch East Indies:																
Belawan Deli	C	1														
Borneo	C		1		185	17	43	20	10							
	D		1		12	16	12	2	1							
Java—																
Batavia and West Java	C	17	14	14	78	30	25	8	1	1		5	1			
	D	10	7	7	6	6	1	3	1	1			2			
East Java and Madura	C															
Sanggi Islands	C	17	25	12	5											
	D	3			1											
Sumatra	C	1	2		48											
	D				5											
Egypt: Port Said	C		2			1					1					
Great Britain:																
England and Wales	C	1,005	1,455	1,530	1,700	423	345	353	306	462	324	304				
Ashton under Lyne	C	3	4	29	15	9	3	4	2	6	3	4				
Bradford	C	8	5	2		1			2		1					
Cardiff	C				2	1	2									
Leeds	C		6	11	16	1	1									
London	C	480	597	699	710	169	169	129	137	222	138	148				
London and Great Towns	C	799	1,101	1,156	1,239	308	264	265	229	339	250	235				
	D		2	5	3	2	1	1								
Sheffield	C				8	1	1									
Stoke-on-Trent	C	12	12	41	122	17	23	33	12	19	9	13				
Greece: Patras	C	1														
Hedjaz	C	11	11													

[1] 5 cases of smallpox were reported Apr. 14 in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	19	26	May, 1930 3	10	17	24	31	June, 1930 7	14	21
India	C	12,789	26,524	36,036	39,329		7,786	8,385								
	D	3,730	6,186	7,710	9,109		1,543	1,779								
Bombay	C	119	342	638	718	143	114	89	84	52	68	58	40			
	D	57	164	314	431	88	78	64	44	33	49	44	35			
Calcutta	C	88	185	399	361	153	116	122		109	70	52	71			
	D	62	130	287	305	124	97	103		94	72	40	52			
Cochin	C	234	234	184	291	56	49	58	20	13	8	7	9			
	D	20	27	29	35	3	4	6	2	5	1	2				
Karachi	C	17	30	38	33	10	9	7	4		6	7	1			
	D	11	9	16	47	10	3	2	2	2		1	1			
Madras	C	85	105	159	173	55	26	27	25	24	13	15	20			
	D	16	16	29	36	6	6	5	10	4	5	6				
Moulmein	C	18	65	143	146	10		33		27	29	20				
	D	9	18	40	41	4		3		4	6	5				
Negapatam	C			1								1				
Rangoon	C	2	7	7	10		1	1	2	2		3	1			
	D		4	2	5					1						
Tuticorin	C		3									5				
Vizagapatam	C	2	5	9	69	1		2	3	3	1	1				
	D			1	18	1			1		3					
India (French):																
Chandernagor	C		3	11	6	4		6		6	2	8	8			
	D			5	2			2		2	4	1				
Karikal	C		3	12	24	8	9	2		6	5	1				
	D		3	8	7	3	3	2		2	1					
Pondicherry Province	C	20	22	52	21	12	1	11		9	13	10	8			
	D	19	19	40	13	11	1	8		7	12	10	7			
India (Portuguese)	C		16	50	38	5	6	15	17							
	D			6	2			5	3							
Indo-China (see also table below):																
Pnompenh	C									1		1	1			
	D		1				1	1								
Saigon and Cholon	C	4	3	4	3			4	1	1						
	D	2	3	2	1		1	3	1		1		1			

Iraq:																
Baghdad	C	16	7	3		1	2	3	2					1		
	D	5	3	1					1							
Basra	C			1					1							
Mossoul Liwa	C	80	26	12			22			13		8				
	D	3	7	2			3			2		1				
Ivory Coast (see table below).																
Jamaica	C												2			
Japan: Tokyo	C								1							
	D								1							
Macao	D			2	3	1			1	1						
Mexico (see also table below):																
Jalisco (State): Guadalajara	D	9	9	14	22	6	4	8	2			6	1	4		
Juarez	C	3	2	3	2											
	D	2	1	1												
Mexico City and surrounding territory [1]	C	25	30	38	106	36	19	20	24	30						
	D	4	7	21	31	14	8	14	11	6						
Morelos State.[2]																
Progreso	C											1				
	D											1				1
San Luis Potosi	C			1												
	D			1												
Morocco (see table below).																
Netherlands: Rotterdam	C	1														
	D															
Nigeria (see also table below): Lagos	C	2	5	2	1	1										
	D	1	2													
Persia (see table below).																
Philippine Islands: Sarangani and Balut Islands [3]	D	40	18	3												
Poland	C	2		2				2	5		1					
Portugal: Lisbon	C	6	4	7	7	2	3	3		6		2				
Rumania	C		1	1	2											
Siam	C	42		2		2	2	2	2	2						
	D	9	1				2	2								
Somaliland, British: Boales	C	5	35	19	2											
	D	9	8	2	6											
Straits Settlements	C		2		5	2	1		2	1	3	2				
	D		1		1	1			1		1	1				
Sudan (Anglo-Egyptian)	C	290	230	79	60	2	9	31			5	13	1	4	8	1
	D	65	34	6	5	1		3				1	1			
Sudan (French) (see table below).																
Syria (see table below).																
Tunisia: Tunis	C	20	7	3	3			1	3							
Turkey (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P	P	P		P								
Natal	C															
Orange Free State	C	P	P	P	P											
Transvaal	C	P	P	P	P											

[1] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[2] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity giving 600 deaths in preceding 2 weeks.
[3] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April 19	April 26	May, 1930: 3	May 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21
Upper Volta	C			26	2	2		1								
Zanzibar	C				13											
On vessel:																
S. S. Tairoa, at Liverpool, from London	C			1												
S. S. Karagola, at Zanzibar, from India	C		4													
S. S. Karagola, at Lourenço Marques, from India	C			1												
S. S. Elysia, at Port Sudan, from Bombay	C						1									
S. S. Naldera, at Port Said	C									1						

Place		December, 1929	January, 1930	February, 1930: 1–10	Feb. 11–20	Feb. 21–28	March, 1930: 1–10	Mar. 11–20	Mar. 21–31	April, 1930: 1–10	Apr. 11–20	Apr. 21–30	May, 1930: 1–10	May 11–20	May 21–31
Belgian Congo	C	74													
	D	4													
Dahomey	C	19													
Indo-China (see also table above)	C	142	460	148	286				26	261				173	132
Ivory Coast	C							7							
Sudan (French)	C	17	229	12	P	201		200	409	371		150	40	16	178
	D		25	1		10		18	31	30		6	7		18
Syria: Beirut	C	25	70	4	7	7	4	8	5	10	2	7			
Taiwan: Taihoku	C				31	12	31	12	15	10	2				

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	6		
Chosen	C		1	4			
Mexico: Durango (see also table above)	D	4	12	6	5	4	
Morocco	C	84	29	74		10	
Nigeria	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Week ended— March, 1930			April, 1930				May, 1930					June, 1930	
					15	22	29	5	12	19	26	3	10	17	24	31	7	14
Algeria:																		
Algiers	C	14	3	4	2	1		3	2	3	2	1	1	2	4	8	2	
Constantine Department	C	2	4	5	2	3		6	4	9	2			4		2	11	
Oran	C		2													3		
Arabia: Aden	C				1													
	D				1													
Bulgaria	C	41		13	9				15				1		5			
	D	2		1					1				1					
Sofia	C		1															
Chile:																		
Talcahuano	D		1															
Valparaiso	C		1															
China:																		
Manchuria—Harbin	C			1				4	5		20	27						
Shanghai	C				1													
Tientsin	C	1	1															
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C										1							1
Assuan	C	9																
	D	1																
Beheira Province	C	7	14	18			2				2			21	9	10	17	
	D			5										4	4	1	1	
Cairo	C			5														
Dakahlieh	C	11																
	D	2																
Port Said	C		2	1														
Suez	C		1															
Great Britain: Scotland—																		
Glasgow	C													1				
	D													1				
Greece (see table below).																		
Iraq: Baghdad Liwa	C	1						2										
	D	1																

Ireland:																		
Irish Free State	C	1																
Ballina—Mayo County	C															2		
Dingle—Kerry County	C										3	2						
Swinford—Mayo County	C													7	7			
Northern Ireland—Cookstown	C			3														
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	6	12	9		2	1	1	2	1		1						
	D	2	4				1		2	1		1						
Morocco	C	6	23	21	4	7	14	13	6	5	3	1	3	6	1	1		
	D						4	3	2	1								
Palestine	C			1	1	1	2	2		1				2			2	
Poland	C	61	296	183	69	54	43	61	59	64	53	67	64	45	34	28		
	D	4	21	8	5	2	2	4	4	2	3	6	2	2		1		
Portugal:																		
Lisbon	C											4						
Oporto	C			1		2			1									
Rumania	C	82	241	293	90		95											
	D	5	25	23	7		5											
Tunisia	C	2		3									2		1			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P		P	P	P								
Natal	C	P	1	3				P	P	P	P							
Orange Free State	C	P	P	P	P	P		P										
Transvaal	C								P	P	P							
Yugoslavia (see table below).																		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Chosen: Seoul	C	1		17				Lithuania	C	5	2	70	62		27
Czechoslovakia	C		10	2	42	29			D	1		5	4		
France	C	1						Turkey	C	4	2	3	1	3	
Greece: Athens	C	6	12	6	3	1		Yugoslavia	C	6	26	33	46		
Latvia	C	2	18						D	1	3	5	2		

YELLOW FEVER

On April 22, 1930, two cases of yellow fever were reported in Mage, Brazil, located on the Leopoldina Railway, between Rio de Janeiro and Nichtheroy; one case of yellow fever was reported in Campos, Rio de Janeiro Province, Brazil, on May 23, 1930; and one case of yellow fever was reported in the Gold Coast during the week ended December 21, 1929. A case of yellow fever was reported in Monrovia, Liberia, on June 3, 1930.

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